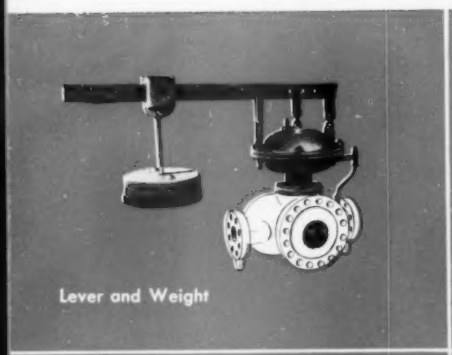
GAS

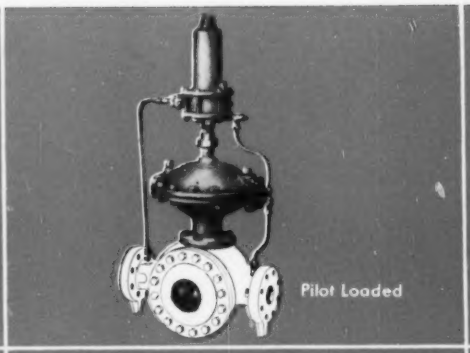
AUGUST 1960

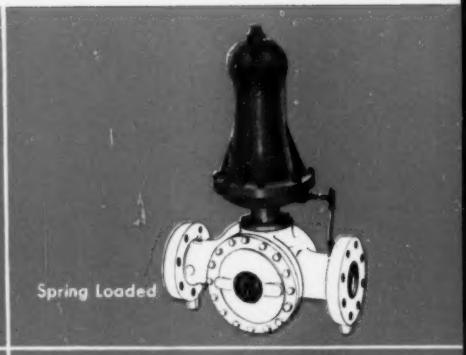
Bell-hole pipelining

A CHILTON PUBLICATION

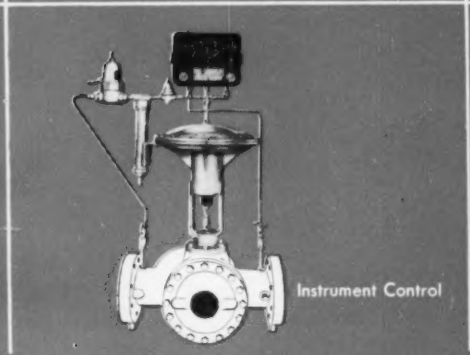
THE NATION'S NATURAL GAS AUTHORITY

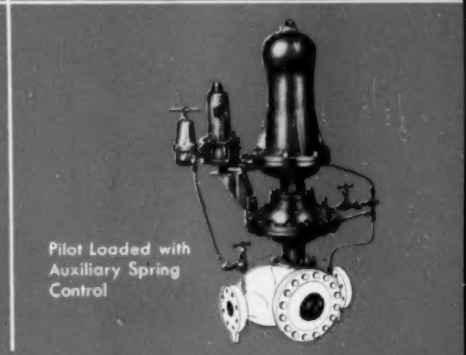

Lever and Weight


Pilot Loaded

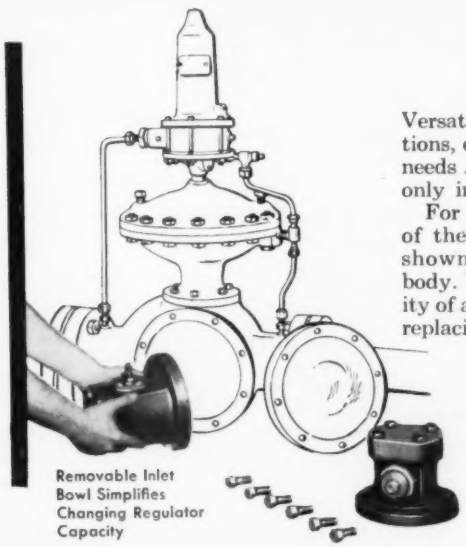

Spring Loaded

Pilot Loaded with Auxiliary Lever and Weight


Instrument Control


Pilot Loaded with Auxiliary Spring Control

The same Rockwell "015" Regulator body accepts all these controls


Removable Inlet Bowl Simplifies Changing Regulator Capacity

HOW TO SAVE STOCKING SPARE REGULATORS

Versatile in their range of basic applications, easily adapted to meet changing needs . . . these are the extras you get only in Rockwell "015" regulators.

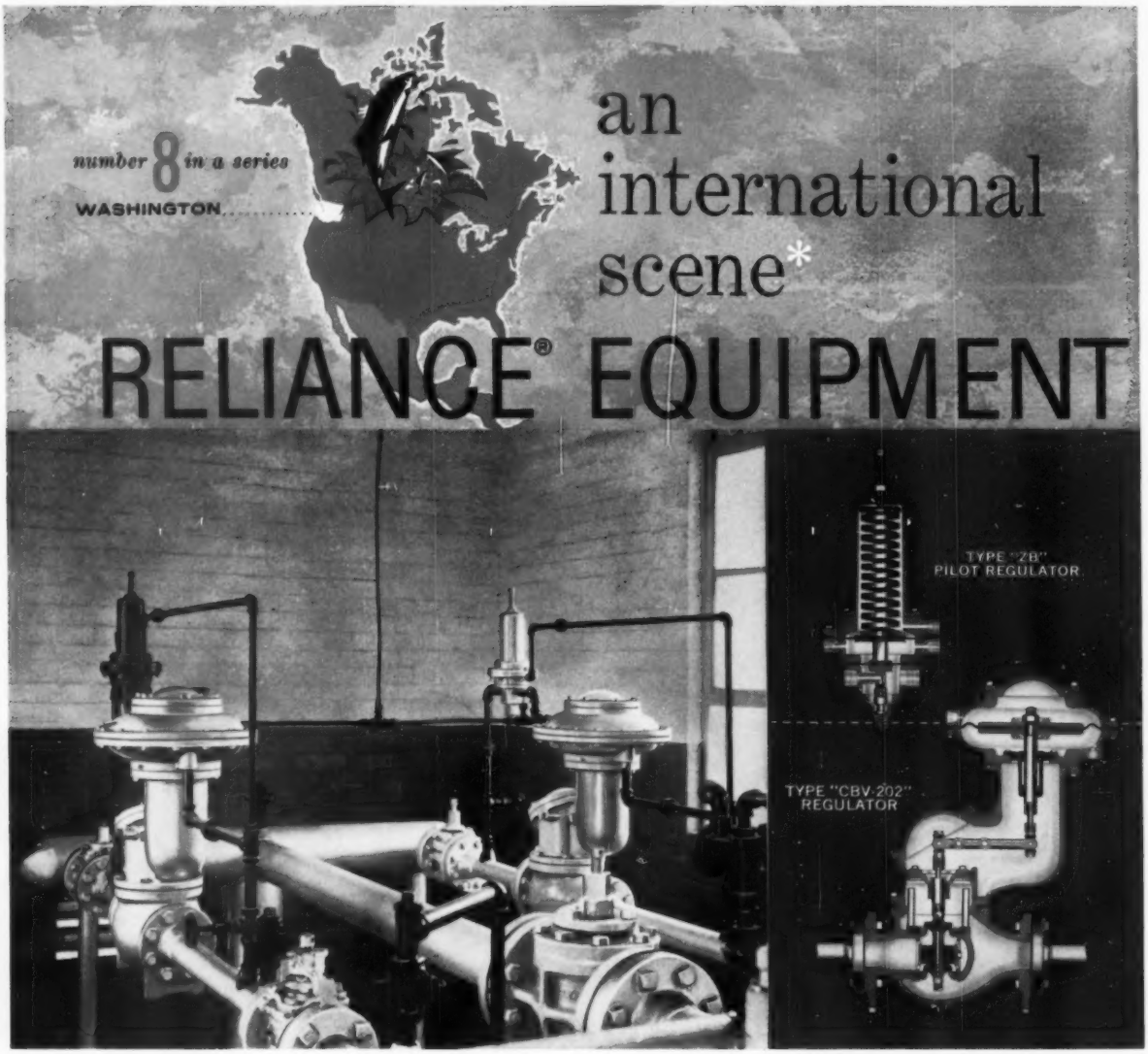
For example you can attach any one of the six different control systems shown above to the same regulator body. You can even change the capacity of any Rockwell regulator at will by replacing the inlet bowl assembly with a larger or smaller size. You can do both operations in the field and without breaking connections. You'll save time and money by converting existing installations to meet pressures, loads and safety conditions as they occur. Write for bulletin 1026. Rockwell Manufacturing Co., Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Company of Canada, Ltd., Guelph, Ontario.

GAS EQUIPMENT MANUFACTURERS GROUP GEM MEMBER

"015" REGULATORS

another fine product by

ROCKWELL



One of many compact, safe and reliable gas control installations

This is a typical application for high pressure regulation. Illustrated are two Type "CBV-202" High Pressure, Offset Connected, Pilot Loaded Reducing Regulators. Outlet pressure ranges 1 to 300 lbs. Available in 2 to 12" sizes. These fully inclosed balanced valve regulators are ideal for vaults. ■ Also illustrated in this installation are two Type "ZB" High Pressure Pilot Regulators. Inlet pressures up to 1000 lbs. may be safely handled with outlet pressure range of 2 to 225 lbs. ■ *Write for bulletins containing complete specifications.*

*All over Washington you will see installations equipped with **RELIANCE REGULATORS** and **AMERICAN METERS** for dependable control and precise measurement of gas.*

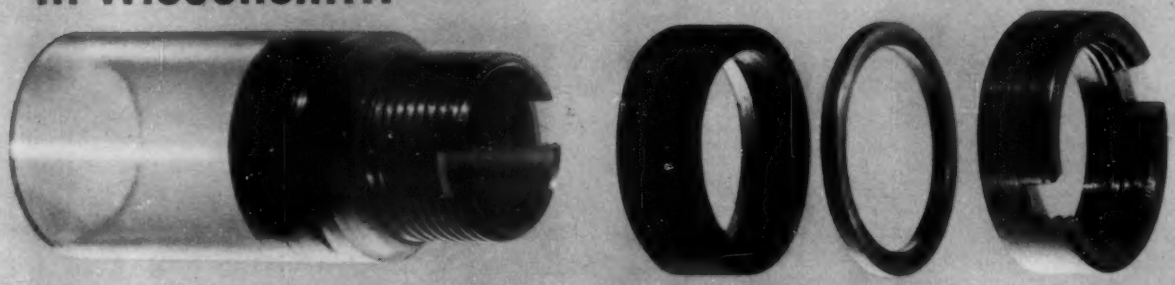
General Sales Offices in principal cities in the United States and Canada

AMERICAN METER COMPANY
INCORPORATED ESTABLISHED 1903

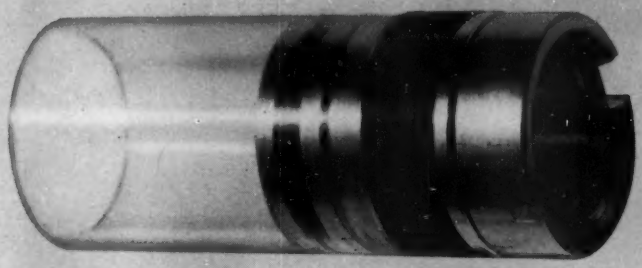
AMERICAN METER CO MEASUREMENT ENGINEERS

RELIANCE REGULATOR DIVISION
FULLERTON, CALIFORNIA

In Wisconsin...



Perfex adapters simplify Butyrate service renewals



Wisconsin Public Service Corporation makes quick, economical plastic-to-metal service head connections with a new leakproof adapter

Wisconsin Public Service Corporation is one of the latest major utilities to adopt plastic tubing of Tenite Butyrate for service renewals. A time-and-money-saving highlight of their installation procedure is the use of a patented service head adapter developed by Perfex Plastics, Inc., of Chicago. With this new adapter, service head fittings are made neatly in existing lines with no repiping or offsetting (see illustration).

Using Butyrate tubing, the utility estimates that a crew of two men can install 2½ to 3 renewals per day. An exclusive feature of Butyrate gas tubing is its availability in transparent form—a feature especially useful when plastic-to-plastic joints are made, since the red cement employed permits the crew to make a visual check of the solvent weld.

Tubing of Tenite Butyrate is available in 20-foot lengths or in continuous coils. Since 1943, well over 1,000 miles of this tubing have been installed by three major utilities alone, for both renewals *and new services*.

When your company starts thinking about a plastic pipe material, think first of Tenite Butyrate, the favorite among natural gas distributors. For further information, write to EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENN.

How service head adapter works:

The service head adapter consists of a 3-in. length of transparent tubing sealed to a threaded metal sleeve. Plastic end of adapter is solvent-welded to the Butyrate pipe that has been inserted into the corroded metal service line. Special spanner wrench has lugs that fit into collar on adapter, and is used to force collar against a natural rubber gasket that expands to fit tightly against inside diameter of the old service pipe, making the renewal gastight and leakproof.

The complete renewal kit, as sold by Perfex, also includes an inner compression sleeve and an outer protective sleeve for the main end connection, plus tubing and solvent cement.

TENITE®
BUTYRATE
an Eastman plastic

GAS

CONTENTS

AUGUST 1960

36TH YEAR OF PUBLICATION

VOLUME THIRTY-SIX · NUMBER 8

FEATURES

▪ DISTRIBUTION

Politics predominated California's gas conference 53
By J. Fred Ebdon

City Utilities calls on its 'emergency plan' 59
By E. L. Keene

Robertshaw's initial pipeline equipment entry 63

Is the cost of your gas requirement at a minimum? ... 64
By Charles M. Tenney, Jr.

Infra-red hot 68
By A. Thomas Haldeman

Responsibility of outside contractors 72
By W. T. Taymans

▪ PIPELINE

Bellhole pipeline brings additional gas to southern California 105
By J. Fred Ebdon

The PLGS project 107

Cal-Counties project 114

Kansas-Nebraska expands its microwave system 120
By A. J. Sigel

▪ DEPARTMENTS

Editorial Comment—

Thermally Thinking, *by J. Fred Ebdon* 6
Highlights 8
Technical Trends, *by Guy Corfield* 11
Washington, *by Neil Regeimbal* 13
Corrosion Prevention, *by Marshall E. Parker* 15
Regulatory Trends 17
The Gassing Game, *by Jim Clark* 23
Communications, *by Frank Chapman* ... 128

News Developments—

Gas hungry states look to underground storage . 80
Hawaii helps Alaska's gas distributor 82
Texas Gas, Shell case returned to lower court. 138
Sees delays in Canada-to-California line 140

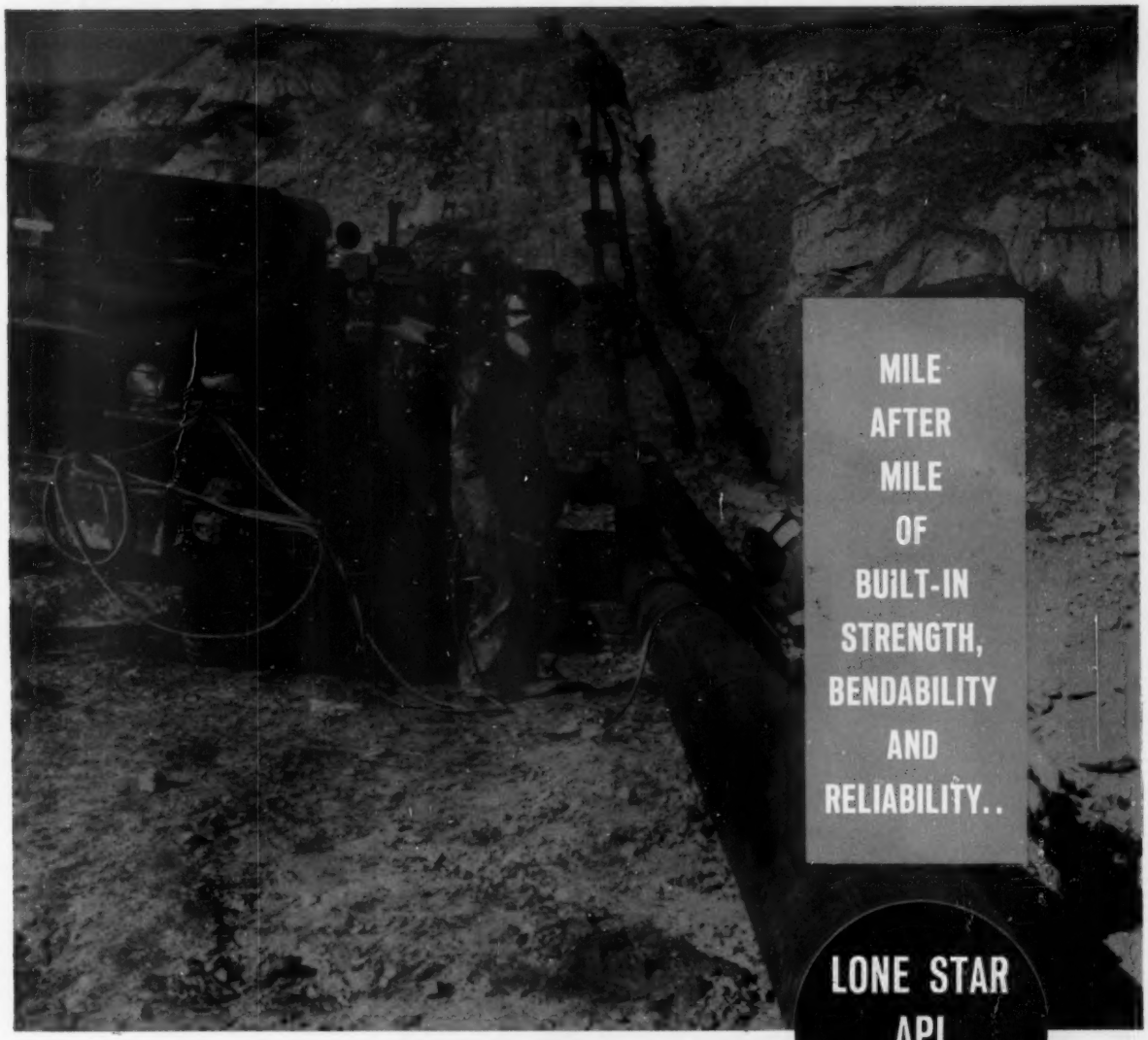
Departments—

Calendar 5
Associations 74
Digest of New Products & Trade Literature... 90
People 96
Pipeline People 146
Advertisers Index 152

BPA

Gas is published monthly. Copyright 1960 by Chilton Company, 55th and Chestnut Streets, Philadelphia 39, Pa. Subscription price: United States and possessions and Canada (in advance): one year, $2.00; two years, $3.00. Mexico, South and Central America, Caribbean Area: one year, $3.00; two years, $5.00. All other countries: $10 per year. Accepted as controlled circulation publication at Philadelphia, Pa. Members: Business Publications Audit of Circulation, Inc., National Business Publications, Inc. Gas is indexed regularly by Engineering Index Inc. The name "GAS" is registered U. S. Patent Office.

NBP



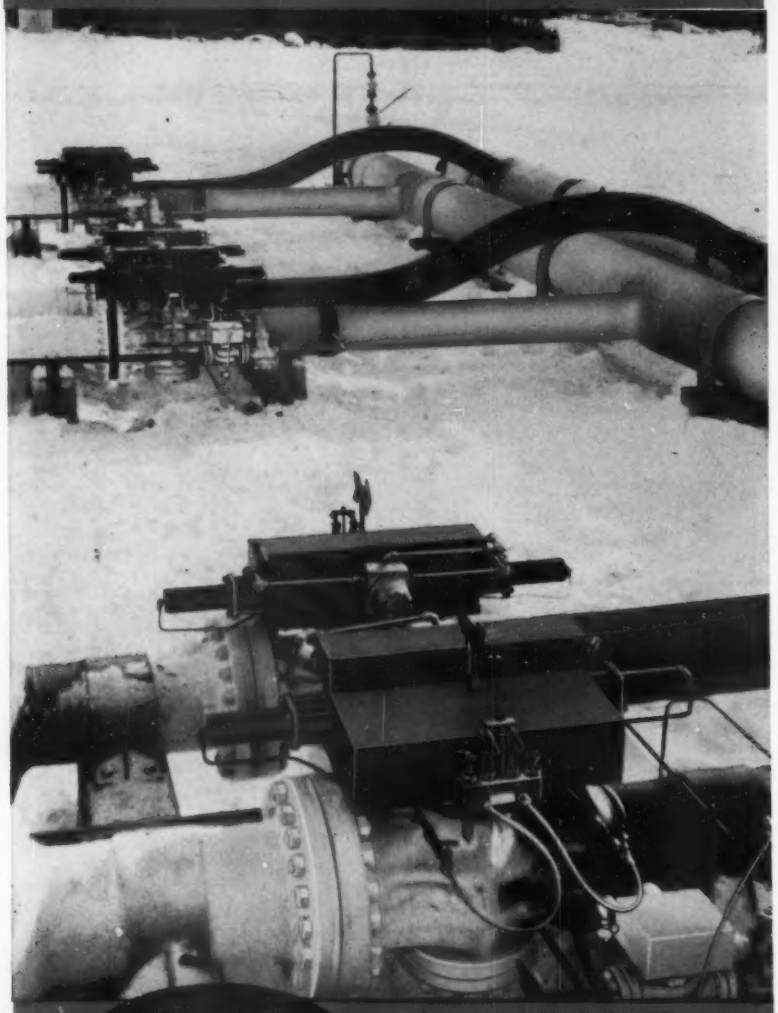
from the oil and gas country's most modern pipe mill. Every length fully normalized.

Lone Star STEEL
COMPANY

EXECUTIVE—SALES OFFICES
W. Mockingbird Lane at Roper • P. O. Box 12226 • Dallas, Texas
DISTRICT SALES OFFICES
912 Republic National Bank Building, Dallas, Texas
Houston, Texas | Midland, Texas | Tulsa, Oklahoma

Joe Roughneck's Pipe Mill

AUTOMATIC COMPRESSOR LOADING



Ledeen

VALVE ACTUATORS AND CONTROLS

Valve Operators for automatic startup and shutdown sequencing can be provided with electric or pneumatic controls. Actuators shown are powered by central hydraulic system. Also available for direct gas operation.

Write us for engineered recommendations for your requirements.

LEDEEN, INC.

3346 No. Gilman Road • El Monte, California • CUmberland 3-3163

GAS

A CHILTON PUBLICATION

198 S. Alvarado St., Los Angeles 57

Tel. DUnkirk 7-4337

Frank Chapman, Publisher

J. Fred Ebdon, Editor

Robert J. Clay, Managing Editor

William T. Harper, Eastern Editor

Barbara Hall, Assistant Editor

Guy Corfield, Technical Editor

Neil Regeimbal, Washington Editor

Paul Wooton, Washington Member, Editorial Board

Raymond A. Grote, Art Director

John H. Kofron, Research Director

Robert Gunning, Readability Consultant

Gilbert Bowman, Promotion Manager

Mary Lou Dorian, Production Manager

Gerald N. Smith, Circulation Manager

ADVERTISING OFFICES

New York (17)
Richard Duffy
100 E. 42nd St.
OXford 7-3400

Cleveland (15)
Frank J. Enright
Joseph R. Geryk
930 B. F. Keith Bldg.
1621 Euclid Ave.
SUperior 1-2860

Chicago (1)
Richard L. DeMuesy
360 N. Michigan Ave., Suite 418
RAndolph 6-2166

Dallas (6)
Harold E. Mott
189 Meadows Bldg.
EMerson 8-4751

Atlanta (3)
John W. Sangston
911 Wm. Oliver Bldg.
32 Peachtree St. N.E.
JAckson 3-6791

San Francisco (3)
Frank McKenzie
Merchandise Mart
1355 Market St.
UNderhill 1-9737

Los Angeles (57)
Jack Kay
198 S. Alvarado Street
DUnkirk 7-4337

G. C. BUZBY, President

Vice Presidents: P. M. Fahrendorf, Robert E. McKenna, Leonard V. Rowlands, George T. Hook. Treasurer, William H. Vallar; Directors: Maurice E. Cox, Frank P. Tighe, Everit B. Terhune, Jr., Russell W. Case, Jr., Chas. A. S. Heinle, John H. Kofron, George E. Cameron.

Stanley Appleby, Comptroller

CALENDAR

August

29-31..20th Annual Appalachian Gas Measurement Short Course—West Virginia University, Morgantown, W. Va.

September

12-13..NEGA Gas Utility Managers Conference — Wianno Club, Mass.

12-14..AGA Accident Prevention Conference—Leamington Hotel, Minneapolis.

21-23..Southeastern Gas Association Annual Meeting — Sir Walter Hotel, Raleigh, N. C.

21-23..PCGA Annual Convention — Westward Ho Hotel, Phoenix, Ariz.

22..NEGA Safety Conference—Statler Hotel, Boston

27-29..Mid-west Gas Association Gas School and Conference—Iowa State College, Ames.

October

4-5..Gas Measurement Institute — National Guard Armory, Liberal, Kan.

5-7..Wisconsin Utilities Association Gas, Electric, Sales & Engineering Convention—Schroeder Hotel, Milwaukee.

9-12..AGA Annual Convention—Atlantic City, N. J.

17-21..National Safety Council Annual Meeting—Chicago.

23-25..Independent Petroleum Association of America Annual Meeting—Statler Hilton, Dallas.

November

1..NEGA Operating Division—Statler Hilton, Hartford, Conn.

14-16..American Petroleum Institute Annual Meeting—Chicago.

15-16..Natural Gas Pipeline Institute—Court Room, Court House, Liberal, Kan.

1961

March

13-17..National Association of Corrosion Engineers Annual Meeting Hotel Statler, Buffalo.

15-17..New England Gas Association Annual Meeting—Hotel Statler, Boston.

20-22..AGA General Management Section Conference—Frances-Marion Hotel, Charleston, S. C.

27-29..Mid-West Gas Association Annual Meeting — Sheraton-Fontennelle Hotel, Omaha.

KA-MO

DOES IT IN ONE OPERATION . . .

Bores Hole, Installs Casing at the Same Time . . .

Here 106' of 24" diameter casing is being installed under a railroad bed as 18 hp air-powered Ka-Mo drill bores hole ahead through compacted clay and ballast. Drilling Time: 4 hours.

Line work that crosses highway, byway and city streets calls for Ka-Mo. With a Ka-Mo drill you can install casing as you bore without fear of costly cave-ins . . . without stopping traffic or cracking pavement . . . no back filling or re-surfacing.

Your Ka-Mo drilling specialist can recommend the right drill for you. He knows his field . . . has helped many cut costs and speed line installation work. Ka-Mo drills available in 2" to 48" sizes, and larger. Powered by air, hydraulic, electric, gasoline or diesel to meet job requirements. Get in touch with your Ka-Mo man or write for Ka-Mo engineering booklet today.

KA MO **KWIK-MIX CO.**
Ka-Mo Tools Dept.
Port Washington, Wis.

A Division of KOEHRING *Company*

See your distributor about the 1960 KOEHRING EQUIPMENT SHOW — Waukesha, Wis., Week of Sept. 19th.

KAMI GAS

Name .....

Title .....

Company .....

Address .....

City ..... Zone ..... State .....

GAS

AUGUST 1960

Thermally Thinking

Politics . . . 1960

AS we write this corner this month, we have just experienced the quadrennial convulsions of nature that spewed forth a Democratic candidate for President of the United States. The inattention on the part of the delegates was remarkable; the speeches long, woven from hackneyed phrase threads, and generally unheard on the convention floor; and the platform revealed—as do all platforms, regardless of party—that the Democrats are for good and against evil.

I am sure that the Republican Convention will be similarly described, and its platform will be just as all-encompassing, which makes any political platform practically meaningless.

The whole thing makes me yearn for the return of a system used in the early days of this Republic. Then, presidential candidates were chosen by Congressional caucuses. The system produced both Adamses, Monroe, Madison, Jefferson, and Washington—the first six presidents. I don't think any of these men would have made it at a modern party convention.

But, politics are politics, and nearly everybody thinks they are real great. I wonder if we consistently get the very best men or even really well qualified men from either party under the circus system of convention fast-dealism.

Perhaps some words from the Democratic Platform are germane. Here are a couple of planks that might interest the gas industry. (We'll report those from the Republican Platform next month.)

"The Democratic administration instead (*of the Republicans—Ed.*) will foster the development of efficient regional giant power systems from all sources . . . to supply low cost electricity to all electric systems, public, private and cooperative . . .

"The Democratic administration will continue to develop 'yardsticks' for measuring the rates of private utility systems. This means meeting the needs of rural electric cooperatives for low-interest loads for distribution, transmission and generation facilities; federal transmission facilities, where appropriate, to provide efficient low-cost power supply; and strict enforcement of the public-preference clause in power marketing . . .

"We support the establishment of a national fuels policy . . .

"The Democratic Party favors a study of the problem of non-uniform seaward boundaries of the coastal states . . .

"The Democratic Party promises to clean up the federal regulatory agencies. The acceptance by Republican appointees to these agencies of gifts, hospitality, and bribes from interests under their jurisdiction has been a particularly flagrant abuse of public trust . . .

"We promise a thorough review of existing agency practices, with an eye toward speedier decisions, and a clearer definition of *what constitutes public interest* . . .

". . . . We shall close the loopholes in the tax laws by which certain privileged groups legally escape their fair share of taxation. Among the more conspicuous loopholes are depletion allowances which are inequitable, special considerations for recipients of divided income, and deductions for *extravagant 'business expenses'* . . ."

Well, if the Democrats get in and actually intend to get rolling with this platform, we in the gas industry had better run for the hills. It is a real platform for the people—if you hold with the Democratic definition that "people" are any persons facing toward Washington with either or both hands out. But, as we all know, platforms may or may not reflect what a President will do when he takes office.

I would not even suggest that anyone vote as I will. But I do plead for active interest in things politic by every member of the gas industry. Foreign affairs are important, but consider that domestic affairs are too.

It is selfish philosophically to say let's examine both platforms and candidates to determine those under which the gas industry can prosper and, through its health, best carry out its obligation and tradition to the public. But, labor makes its influence felt; radical groups certainly are not quiet; public-power socialists appear to get what they want; and other minorities call some shots.

So, I say let's join 'em. Get out the gas industry vote, study the issues, and get active in politics.

J. Fred Ebsan

EDITOR

FOR GAS MEN ONLY!

POWERS American

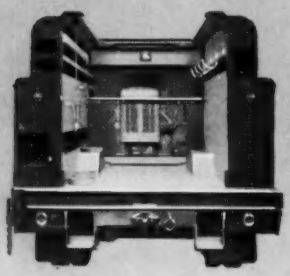
SERIES 850-C

Gas Line Construction and Maintenance Body

Looks like a streamlined warehouse on wheels doesn't it? And, why not—for that's what it is. The 850-C is designed to carry everything (including air) needed for any gas construction or maintenance job. That means plenty of room for hand and pneumatic tools, pipe and fittings, parts and welding equipment . . . name it, and there's a place to carry it in the Series 850-C.

There's plenty of room for a seven-man crew, too—four in the comfortable crew compartment that's part of the body, and three in the truck cab.

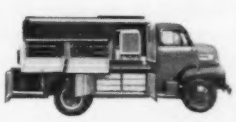
Bodies can be furnished in lengths ranging from 12'3" to 14'3" . . . or without crew compartment in 9' to 12'6" lengths . . . equipped specifically for your job.



Air compressor . . . driven by truck engine through a power take-off, or gasoline-powered . . . can be supplied—with air receiver — in capacity desired.

Hose reels, holding 50 ft. of ¾" high pressure air hose, are installed in lower rear compartments . . . pay-out and take-up hose through openings at rear of body.

CUSTOM-MADE JUST FOR YOUR OPERATION, TOO! Powers-American Series 850-C Bodies, and other standard bodies in the line, can be modified to fit your requirements. Powers-American quality and workmanship is also available in tailor-made bodies . . . built to your specifications or designed by our engineers to meet your specific work needs. Shown here are a few of the hundreds of specially-designed bodies serving operating companies throughout the United States and in many foreign lands.



Descriptive Bulletin No. 206, complete with price information, is yours for the asking.

McCABE-POWERS BODY COMPANY

5900 NO. BROADWAY, ST. LOUIS 15, MO. | 625 CEDAR STREET, BERKELEY 10, CALIF. | 5525 S. E. 28TH. AVE., PORTLAND 2, ORE.

GAS HIGHLIGHTS

Enchilada inch planned?

While it is strictly rumor, usually impeccable sources in Juraez, Tia Juana, and Houston are talking about plans to build a 1200-mile, 34 or 36-in. gas pipeline through northern Mexico from Texas to California state lines. Gas would be for Southern California Edison Co. thermoelectric generators in southern California. One source of gas supply seems to be Pan Am's uncommitted, but reportedly often headed for California, Bastian Bay reserves. Doubtless, Mexican gas also would be involved from Petroleos Mexicanos. Strategy for this exciting plan seems to originate with Tennessee Gas Transmission. Pacific Lighting Corp. can be expected to fight this move.

Texas pipeline tax ruled invalid

A Texas district judge ruled that the new Texas "severance beneficiary" gas tax is unconstitutional. Expected to yield $15 million a year, the tax is 1.5 per cent of the market value of the gas at the wellhead. The decision was the result of test suits brought by several interstate pipelines. More than 100 suits have been filed to challenge the law and seek refunds on taxes paid in protest.

The future: good chances, or a choice?

Two authorities outside the gas industry recently appraised the industry's future from different viewpoints. Joseph Harrer, a nuclear scientist with the Argonne National Laboratory, said chances were slight that atomic power would replace gas or any of the other current major energy forces in the foreseeable future. John Winger, chief petroleum economist for Chase Manhattan Bank, said the oil industry must make a choice between crude oil or natural gas if it ever is to attain lasting relief from its chronic over-supply problem.

Coal still calls for fuel policy

The coal industry—through its mouthpiece, National Coal Policy Conference Inc.—is again calling for a joint Congressional committee to study America's fuel and energy sources. The group recently ran a series of full-page newspaper ads calling for a national fuels policy. These ads were refuted point by point by William J. Goldston, president of Mid-Continental Oil & Gas Association, in a talk before the Gulf Coast Petroleum Writers.

Canadian fuels battle gets hotter

The word in the corridors at the 53rd annual Canadian Gas Association meeting in late June was that the Canadian gas industry was finally going to get some ammunition for its war with coal and oil. The feeling was that the Ontario government may soon set some special industrial rates to allow gas to fight the other fuels. Oil, meanwhile, was sending in all the troops, offering—among other things—free dishes, free insurance policies, and second mortgages to finance home and apartment conversions.

Canada's first line will be looped

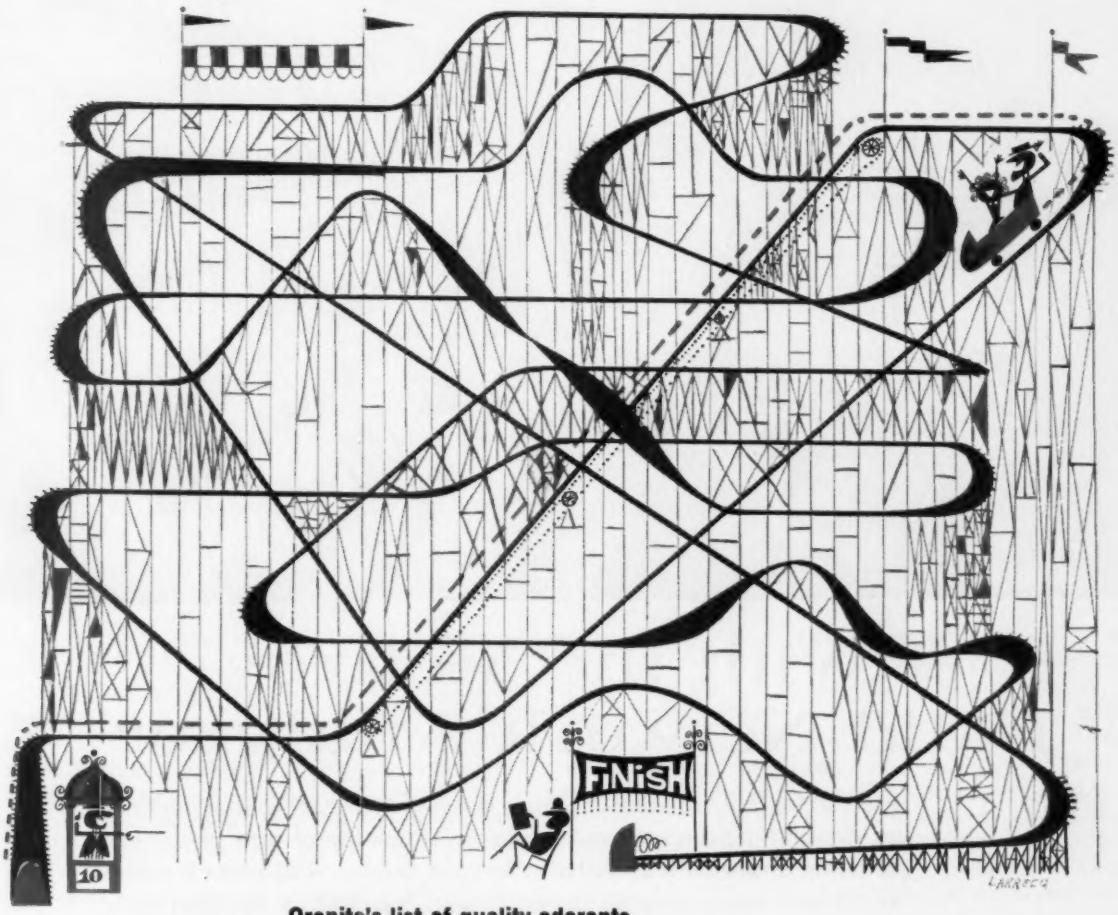
Canada's first big natural gas pipeline, owned by Westcoast Transmission Co. Ltd., will be completely looped in the near future to double its capacity. The 688-mile line, which runs from the Peace River area of British Columbia and Alberta to the U. S. border, will then carry 1 billion cu ft per day. The expansion is prompted by new discoveries and by increased markets in both U. S. and B. C.

Northern expands service 13% in '60

Northern Natural Gas Co. will make natural gas available to 57 more communities this year. A 13-per cent increase, this brings communities on its system to 501. Included in the '60 addition: 34 cities in Iowa, 19 in Minnesota, 4 in Wisconsin.

Is your gas odorant getting to the end of the line?

If you have the critical problem of detectible "end-of-line" odorization, let us discuss Oronite Calodorant "C" with you. Many users tell us it is the most stable odorant on the market. A cyclic sulfide type product, Calodorant "C" does not fade, oxidize, cause corrosion or deposits.



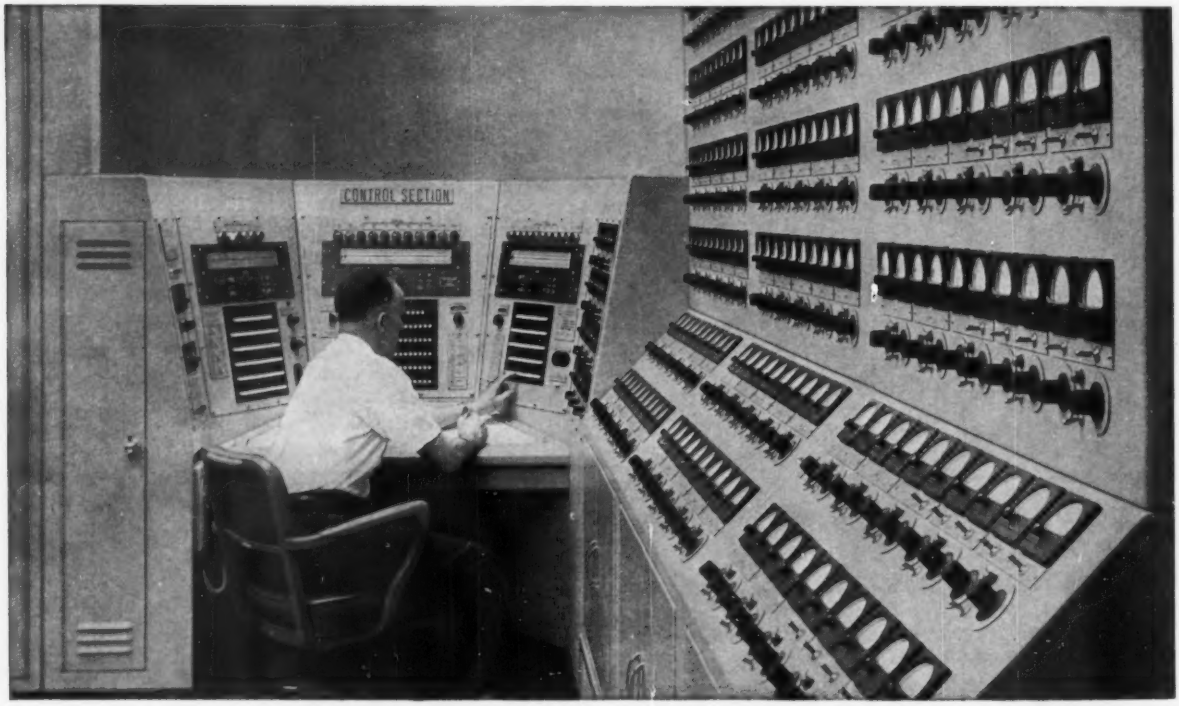
Oronite's list of quality odorants

Calodorant® "C"	best quality sulfide type odorant
Calodorant® B-1	a sulfide odorant at a mercaptan price
Calodorant F	a low boiling, economy priced sulfide odorant
Alert® "80"	best economy priced, quality mercaptan odorant
Alert 101	new tertiary-butyl mercaptan based odorant
LPG Odorant	tailor made from a selected mercaptan cut
Ethyl Mercaptan	an odorant of highest quality and purity

Get Oronite's complete story on gas odorants.

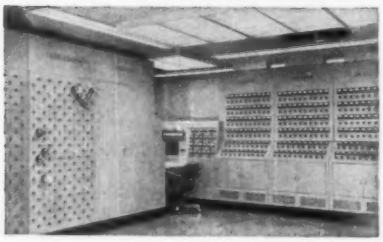
ORONITE CHEMICAL COMPANY
A CALIFORNIA CHEMICAL COMPANY SUBSIDIARY
EXECUTIVE OFFICES • 200 Bush Street, San Francisco 20, California
SALES OFFICES • New York, Boston, Wilmington, Chicago, Cincinnati, Cleveland, Houston, Los Angeles, San Francisco, Seattle
Foreign Affiliate: California Chemical International, Inc., San Francisco, Geneva, Panama

Bring Your System Planning Up-To-Date



...with the McIlroy Fluid Network Analyzer

Every utility that uses a McIlroy Fluid Network Analyzer is better informed on what its pipeline network is doing . . . how every pipe or valve is behaving and what it contributes to good service. And when it comes to network improvements or expansion, the McIlroy Analyzer tells, immediately, what to do, where, and how to do it to accomplish your objectives. It does so before you turn one shovelful of earth . . . before you spend one dollar on new material or labor. Why not let us prove it to you?



STANDARD
TRADEMARK

THE STANDARD ELECTRIC TIME COMPANY

89 LOGAN STREET • SPRINGFIELD, MASSACHUSETTS

TECHNICAL TRENDS

By GUY CORFIELD
Professional Engineer,
Los Angeles

American Standards Association

The American Standards Association is well known to our gas industry because our AGA Approval Requirements for appliances and accessories are also approved by ASA and become American Standards. This enhances both their national and international status. It is interesting to learn something of the operation of ASA.

There are four methods or procedures for development and approval of standards by ASA. The first is the Sectional Committee method. Here a sponsor organization is appointed by ASA to develop the details and submit them for approval. This is typified by the AGA Approval Requirements procedures. AGA has been appointed sponsor and the AGA Approval Requirements Committee is thereby also ASA Sectional Committee Z21.

The second method is known as the Existing Standards method. By it has been developed a large proportion of the more than 1800 American Standards now in effect. These standards are developed voluntarily by a competent organization and submitted to ASA for approval. Many of them have come from the American Society for Testing Materials.

The third is the General Acceptance method. It is invoked when a standard becomes desirable, there is no large organization to take the initiative, and the problem is relatively simple so that the appointment of a sponsor does not seem necessary. The standard is produced solely by a conference of those substantially concerned. It is verified by subsequent written acceptance of enough participants to show a definite consensus. This method was used, for instance, to develop a standard for terminology, sizes, measurements, and marking of baking and cooking utensils, at the request of the American Home Economics Association.

The fourth or Proprietary method is essentially an extension of the Existing Standards method. Through it a national organization can recommend and obtain approval for a revision of an existing standard through the same mechanics that produced the present version.

In general, ASA exercises great care and caution to be sure before acceptance that a standard has substantially unanimous approval of all those interested. Such agreement must be reached not only by the sponsoring or developing organization itself, but also by affiliates or legitimately interested outside groups. As an example our AGA Approval Requirements, to be accepted by ASA, not only must have the approval of the gas industry but also substantially complete acceptance by non-industry members of the Approval Requirements Committee which include representatives of the following:

American Home Economics Association

American Institute of Architects

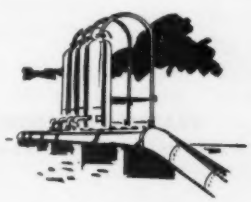
American Petroleum Institute

Associated Factory Mutual Fire Insurance Companies

Canadian Gas Association

Federal Housing Administration

Mechanical Contractors Association of America, Inc.



National Association of Plumbing Contractors

National Board of Fire Underwriters

National Warm Air Heating and Air Conditioning Association

U. S. Dept. of Agriculture, Clothing and Housing Research Div.

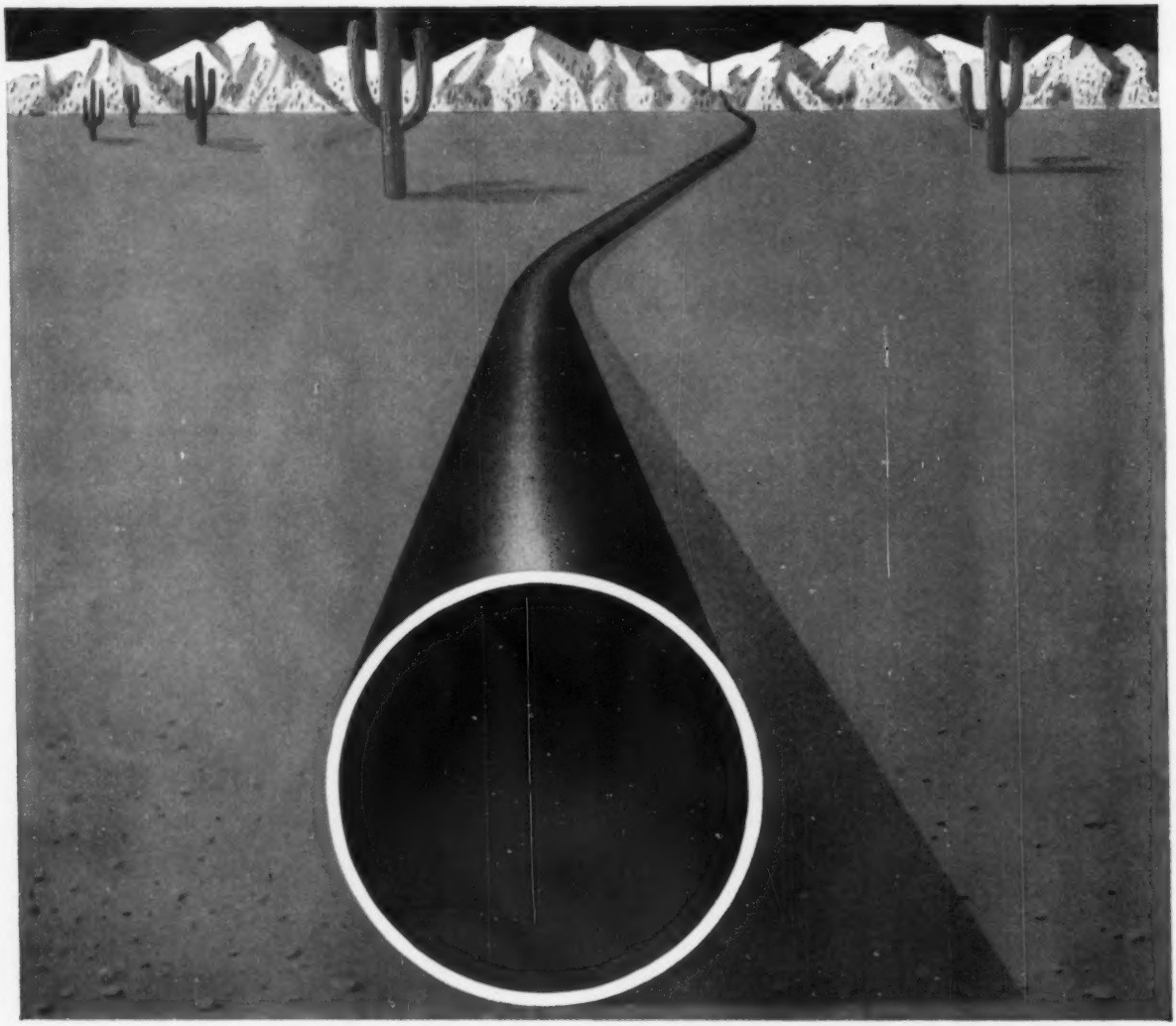
U. S. Bureau of Mines

U. S. Public Health Service

U. S. Dept. of the Army, Quartermaster Corps.

While sometimes criticized for duplicating the work of other organizations and engaging in competition with them, ASA emphatically insists that this is not the case. Its position is that of arranging for and coordinating the development of a standard for which a need develops and which industry requests; and of exercising "the judicial process of determining the existence of a national consensus of acceptance of provisions submitted to it by a national organization, a national conference, or a sectional committee." ASA desires it to be understood and emphasized that the approved standards are American Standards and *not* ASA Standards. They are not the property of ASA but belong to everyone.

Three new ASA projects are of interest to the gas industry; one, designated as ASA Sectional Committee Z83, with AGA appointed as sponsor, will develop standards for Installation and Utilization of Industrial Gas Equipment. Another, ASA Project A119, will at the request of the trailer coach and mobile home industry develop standards for construction and equipment of trailers and mobile homes including fuel gas facilities. The third, which the Instrument Society of America has been invited to sponsor, will cover the manufacture and use of thermocouples for temperature measurement.



ALLIED CHEMICAL'S *HOTLINE ENAMEL

defies 180°F. heat without sliding and −10°F. cold without cracking

Allied Chemical Hotline Enamel's resistance to both high and low temperatures, as well as its greater durability, compared to asphalt base and other coatings, has been proved by laboratory tests, and on-the-job performance for leading public utility companies. Allied Chemical Hotline Enamel is derived from coal-tar pitch, thus possessing inherent protective properties against the damaging effects of water, soil chemicals and electrical currents.

Improves protection under these specific conditions:

1. On pipe-type cables or "oil-o-static lines" which are subject to internal electrical heat from high-voltage surges.

2. Hot gas pipelines, on discharge side of compressor stations where line is above 120°F.

3. Warm, swampy areas or other places where excessive soil stress is encountered.

4. Areas where backfill and trenches are rough, rocky or contain objects which normally penetrate softer coatings.

5. Pipelines (such as heated fuel lines) where temperatures are constantly high most of the time, but do not exceed 180°F. or 200°F. for short term exposure.

*Though we've changed the name from Barrett Protective Coatings to Allied Chemical, you receive the same famous protection—pipeline coatings proved and improved for three generations.

PLASTICS AND COAL CHEMICALS DIVISION
40 Rector Street, New York 6, N. Y.

Allied Chemical

WASHINGTON

By NEIL REGEIMBAL
GAS Washington Bureau
1093 National Press Building
Washington 4, D. C.

Grass roots in political spotlight now

THE political spotlight has swung away from Washington to "grass roots" America. Campaigning politicos of the country have taken the issues with them, and it's up to the adman's "thinking men and women" to determine how they will be resolved.

Gas industry executives, as businessmen generally, have in the next three months a rare opportunity to force vote-seeking candidates to take public stands on the issues which affect the personal and business lives of their community and the economic health of the country.

Presidential tickets and party-wide platforms are pretty well set after last month's conventions. But every member of the House and a third of the members of the Senate are now on the stump seeking votes, lining up support, testing public sentiment, and above all making promises. Many of the promises are made for effect, it's true.

But in every contested election, each candidate's basic philosophy can be illuminated during these campaigns. In many cases, by education through informed citizens, it can be broadened to cover the specific issues in which the industry is vitally concerned.

There are plenty of issues on which every gas industry executive could profitably force candidates they meet this fall to take a stand.

Congress next year will start fresh on a whole string of problems of vital importance to the gas industry. In many cases, the outcome will be traceable to the actions—or lack of them—of gas industry officials during the pre-election period.

In the general legislative category, the industry should be lining up support now for various tax reforms, including government fiscal policies which will permit scheduled reductions in corporate and excise taxes still at war-time rates to take effect. In addition, they should be pressing for meaningful reform in the tax depreciation laws on facilities and equipment. And they should make clear their stand on continuation of the present 27½ per cent gas and oil depletion rate.

The House Ways and Means Committee, which originates all tax legislation, will spend this fall and most of next year in lengthy, detailed studies of the nation's entire tax structure. By 1962, Congress will have before it a massive tax reform bill. There will be few changes made after the bill leaves the Ways and Means Committee.

All members of Congress have ample opportunity to make their views known publicly to the Committee during hearings and privately to its members during consideration of the measure. The views they express are often a reflection of the views of their constituents.

The gas and oil depletion rate, vital to continued exploration and development according to the industry, survived several attacks in the Senate in the closing days of Congress this year. In two votes, the principal architects of the depletion attacks were Sens. Williams (R., N. J.) and Douglas (D., Ill.). One came in the Senate Finance Committee where it was beaten by two votes, and the other on the Senate floor where it was beaten handily 56-30. Both involved efforts to tack a provision setting up a sliding depletion scale favoring small producers onto unrelated tax legislation.

Natural gas legislation will again be a poor prospect for passage when the 87th Congress convenes in January for a two-year session. The reasons are many. It isn't too well understood by the public and thus becomes a tailor-made subject for demagoguery. Its friends have a way of pushing it backwards two steps each time it appears ready to take a step forward.

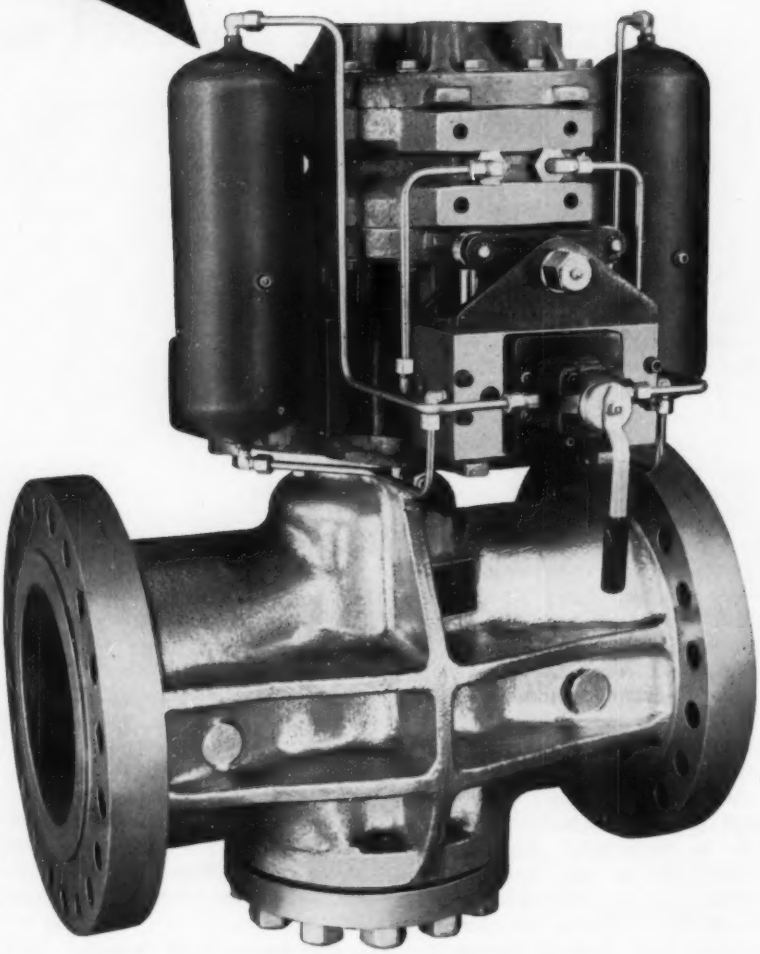
But its fate hinges on many things in the next two years. For one thing, the makeup of the next Congress will obviously be of prime importance. Gas industry executives should know how the candidates for Congress in their areas stand on the proposal. It will depend on how firmly the industry itself makes known its support of legislation freeing producers from utility-type controls. And it will depend to no little extent on how good a job the industry does in explaining the real purpose for and results of such legislation to the customers and the public in general.

Another issue, which indirectly affects all the industry and which will probably come up for settlement in Congress next year, is the offshore oil and gas rights controversy. Problem stems from the U. S. Supreme Court ruling that Texas and Florida have the right to submerged lands three leagues from their coast line, but Louisiana, Alabama, and Mississippi are

Continued on page 100

LimiTorque INTRODUCES.....the new type "G" series GAS-HYDRAULIC OPERATORS for plug valves of any size

SIMPLE • RELIABLE • ECONOMICAL • FAST • SMOOTH OPERATION • DELIVERS TORQUE "WITHOUT SHOCK," THROUGH ONLY ONE MOVING PART



These operators have oscillating vane type Hydraulic motors, applying power directly to the plug valve stem—they can be mounted in any position, and are designed to eliminate the usual gearing found on plug valves.

The new LimiTorque type "G" operators are designed primarily for utilization of gas pressure from the pipe line on which they are installed; however, they can be operated by air or liquids from other pressure sources —with or without accumulators.

For pressure operation, the units are equipped with a shear-seal type directional control valve having three positions: Valve open, valve closed, and neutral. For manual operation, the units operate through a specially designed hand pump mounted on the side of the vane motor. The type "G" units can be easily mounted on the plug valve, and because they are directly centered over the shaft . . . It is not necessary to remove the valve from service in order to install the type "G" unit. No maintenance is required with these operators, and it is not necessary to check the level of oil in the accumulation tanks, as this is taken care of automatically.

For complete information, contact your valve manufacturer, or your nearest LimiTorque Sales Engineering Office.

Write for Bulletin 7A-60

THERE IS NO SUBSTITUTE FOR —

LimiTorque®

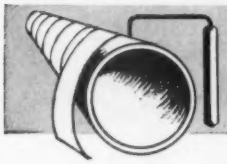
PHILADELPHIA GEAR CORPORATION

KING OF PRUSSIA (SUBURBAN PHILADELPHIA), PA.

Offices in all Principal Cities

INDUSTRIAL GEARS & SPEED REDUCERS
LIMITORQUE VALVE CONTROLS
FLUID AGITATORS • FLEXIBLE COUPLINGS

Limitorque Corporation • King of Prussia, Penna.



CORROSION PREVENTION

DISTRIBUTION TRANSMISSION

Don't keep it a secret

By MARSHALL E. PARKER
Consulting Engineer
Houston

ONE of the biggest mistakes a corrosion engineer can make is that of not being sufficiently communicative about his work. Few are deliberately secretive, but many have so little to say about what they are trying to accomplish that the effect is the same.

A glaring example of this has recently come to the writer's attention. A certain large company, with many miles of major transmission line, has but a single corrosion engineer. Under him there are a large number of technicians, each of whom works only in a small district; in fact, he is actually under the direct orders of a district superintendent, but reports to the corrosion engineer.

Not one of these men has ever received, from his company, any instruction in corrosion principles. None has ever been encouraged to join the National Association of Corrosion Engineers, to attend a meeting, or to go to a national or regional conference. All of their instructions are of the "connect post B to terminal C" type, with no attempt at explanation of what the readings may mean. Readings are entered on standard forms, sent in at intervals, and never heard from again. This kind of work very rapidly becomes similar to pounding sand in a mortar. It is little wonder that the men are not highly enthusiastic about their work.

A certain rectifier on this system was reported for *over two years* with a voltage reading of zero and a current reading of 18 amp. To anyone with a little knowledge of the job, it is obvious that something is wrong here, although it is far from obvious just what is wrong. The first guess most would make is that the voltmeter was inoperative, either through being defective or through a loose connection. Actually, it turned out that the voltmeter was right; the rectifier was off the line (power consumption was also zero, but this company does not read the power meter); the ammeter needle was stuck at 18 amps.

Several things are at fault with an organization in which such an occurrence is possible. In the first place, the field men in a corrosion department should be more than mere recorders of meaningless readings. They should have some knowledge of elementary electricity, and they should receive from their employer some instruction in corrosion fundamentals. What the company is trying to do, how the systems are supposed to work, what new projects are being planned, are all these men's business as well as that of management.

Of course, this is not the only error in the example. The inconsistent pair of readings, turned in month after month without variation, should certainly have aroused some curiosity and stimulated some kind of reaction back at the office.

The other discernible error is the failure to specify reading of the power meter, in addition to the rectifier meters. This reading serves other purposes than the detection of defective units, as in the present case. It makes possible the calculation of rectifier efficiency, so that stack aging can be followed and replacements scheduled in due time.

But instruction in corrosion should not be limited to the men, in field and office, who are directly involved in doing corrosion work. Every man who does anything at all, physically, in the operation of a pipeline, and almost every man who even handles any of the pipeline's paper work, should know something about corrosion and the measures taken against it. The reason this is true is that every man who comes into contact with the pipeline is in a position to nullify part of the corrosion engineer's work, innocently and unwittingly.

The ways in which this can be done are manifold. The ¼-in. gauge line installed by the connection foreman can by-pass an insulated joint, and throw a whole tank farm load of a line section rectifier. The district superintendent can order the removal of a valve—and with it goes a set of flange insulation. The purchasing agent (and this one actually happened) can buy ordinary unions for wellheads, instead of the insulating unions specified. They were much less expensive, and the salesman convinced him that they were easier to install and were much less likely to leak!

Conversely, when the company's whole personnel is educated and properly indoctrinated in corrosion, there are many ways in which they can be most helpful to the program. A connection foreman can drop by a rectifier and check it after a thunderstorm. The district superintendent can let the corrosion engineer know in advance about some planned connection work, so that he can see about his precious insulation. The purchasing agent can help him keep abreast of new developments, and can call him in to help interview salesmen whose products have an influence on corrosion work.

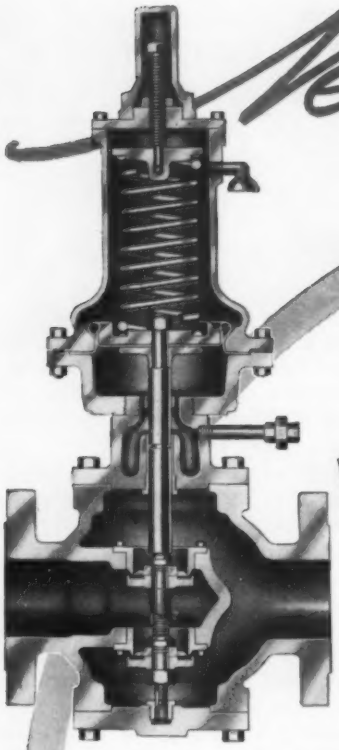
So don't keep secrets from all of these nice people! They can be of immense help to you in doing your job, and, if you do keep them in the dark, they can just about ruin all the good work you can possibly do. ■

New in principle!

CHAPLIN-FULTON

MODEL 441-57S

GAS REGULATOR

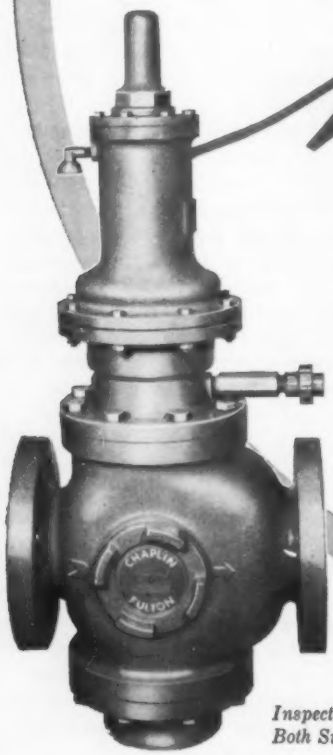


SIZE: 2"—3"—4"—6"
125 lb. iron—W. P. 175 psi
250 lb. ductile—W. P. 400 psi
Series 30 steel—W. P. 720 psi

Model 57-S, a simple spring loaded regulator, operates on a new diaphragm principle which will control accurately until the regulator is wide open. The outlet pressure "fall-off," typical of spring regulators, is eliminated—not by an uncontrolled velocity effect—but by a diaphragm which changes its size as the valve moves to give straight line control. For pounds-to-pounds service,—controlled pressures to 75 psi with same assembly.

New in design!

Also, a new body design—441—with gas exit areas greatly enlarged to prevent turbulence and increase capacity.
And to help in your visual inspection program—side inspection plates on *both* sides of the body have been included. Screwed-on with O-ring seal, they can be quickly removed and replaced—no gasket problem. Standard face-to-face dimensions now make the 441 interchangeable with other regulators.

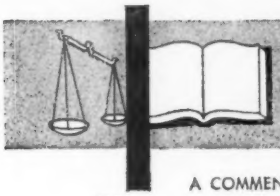


Inspection Plates Both Sides.

ACCURATE CP MFG CO DEPENDABLE

Chaplin-Fulton
MANUFACTURING COMPANY
Pittsburgh 25, Pennsylvania

59-2



Regulatory and Legislative Trends

A COMMENTARY ON NATIONAL AND STATE DEVELOPMENTS BY AN EXPERT IN UTILITY LAW

A national fuels policy

A JOINT Congressional Committee to determine the need for a national fuels policy appears inevitable. Agitation for cosmos out of the existing chaos is growing. Sen. Vance Hartke (D-Ind.) recently focused attention on oil, natural gas and coal, and the economic pains of these fossil fuels. He said, "The petroleum industry is facing a mammoth glut of oil, not only in this country, but on a worldwide scale. This oversupply naturally leads to depressed prices and basically uneconomic marketing practices. The gas industry, controlled as it is by Federal regulation, has been unable to make the proper adjustments to its role in the economy. Wellhead prices for this product have continued to be so low that sufficient incentive for exploration is lacking. The result is that the life index of natural gas has steadily decreased. And the coal industry is in the economic doldrums, causing widespread economic disaster to vast areas of this country."

• Concurrent resolution

The Senate-House Concurrent Resolution to create a Joint Committee to study national fuels contains these sobering assertions:

1. Adequate supplies of fuel and energy resources in all forms are essential to the continued welfare of the nation, to its industrial development, to the consuming public, and to the national security;

2. Authoritative estimates forecast that by 1980 the population of the United States will increase to 250 million and that the consumption of fuel and energy resources will have increased by nearly 100 per centum;

3. Experience has demonstrated that our national reserves of fuel and energy resources are in varying degrees limited, and that in some areas we are in danger of approaching these limits;

4. Maintenance of the basic fuel industries together with adequate facilities for the transportation of fuel and energy resources is essential to national defense and national security;

5. The stability and prosperity of the basic fuel industries are essential to the economic health of the nation;

6. In view of these considerations it has become evident that our inevitably increasing fuel and energy requirements, both for the long-range purposes of peaceful expansion and for the immediate exigencies of national security, cannot be adequately met without a national policy for the most effective utilization of these resources in the public interest;

7. There has not existed and does not now exist in this nation such a policy;

8. The absence of such policy has frequently resulted in uneconomic exploitation of, and wasteful competition between, limited energy resources, resulting in the unbalanced development of fuel industries proportionate to their availabilities and most economic uses;

9. The Congress realizes the imperative necessity of developing an integrated fuels policy for the benefit of the fuel and energy industries concerned, the consuming public, and the nation as a whole; and

10. The Congress in connection with the development of such a national fuels policy desires to have data and recommendations presented for its consideration relative to these needed programs.

The coal industry, through the National Coal Policy Conference, strongly supports the Congressional study, and it is important that management in the gas industry know the reasons stated by coal.

• The coal industry fosters a National fuels policy

The National Coal Policy Conference published a booklet entitled "The Case For A National Fuels Policy Study," which contains the following claims for a better balance in the use of fuels in the United States. Here, paraphrased, are their arguments:

The United States has never had a comprehensive policy regarding its energy resources, needs and problems. Existing policies treat each of our energy sources—coal, oil, gas and the atom—as separate packages. As stated by the President's Materials Policy (Paley) Commission of 1952, we have regarded our fuels picture "as a loose collection of independent pieces involving different sources and forms of energy."

The Department of Interior, the Department of Commerce, the Federal Power Commission, the Atomic Energy Commission, the Texas Railroad Commission, and public utility commissions in the 50 states all regulate our energy industries to some extent.

Each is concerned with a particular area of the national energy picture, but none is concerned with what the Paley Commission termed "the interrelations among all sectors of the energy field."

For more than 20 years, antedating even the development of atomic energy with its concomitant problems, U. S. energy experts have warned against this piecemeal approach to the nation's fuels problems.

Despite authoritative recommendations, however, the United States

Turn to page 20

Tailor-made for 99% of all household demands...

New

LOW COST, HIGH QUALITY SERVICE REGULATOR.....

Eliminates need for over-size installations

MEETS GROWING DEMAND

It is generally recognized that 99% of the homes using gas for the seven big household services, cooking, water heating, air conditioning, incineration, clothes drying, heating and refrigeration, require less than 250 CFH. With this in mind the S250 was designed to meet the growing demand for a low cost regulator to match the small meters now being put into service.

COMPACT DESIGN FOR LOW COST

Specifically developed for household use, the S250 has no need for the bulky construction required for larger capacity service regulators. This fact, combined with its simple and compact design, makes it a service regulator the gas man can install economically, and in absolute confidence that it will do the job safely and efficiently.

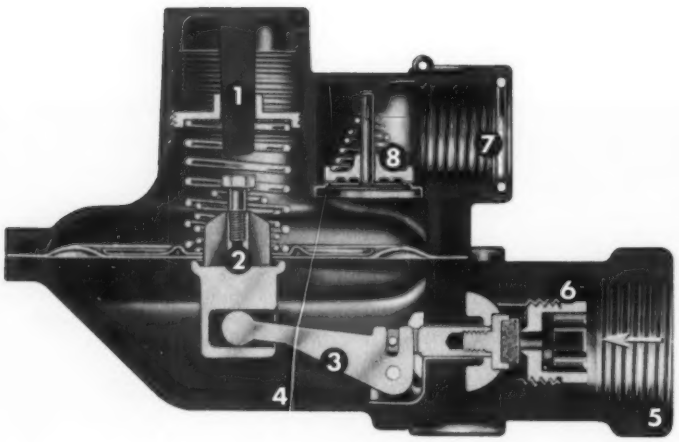
TWO MODELS AVAILABLE

The Series S250 consists of two models . . . one model features the elbow body . . . the other the meter bar body. Both models are available as standard, either with or without *full capacity* internal relief valve. All types feature aluminum body and lower casing one-piece construction, with body sizes ¾, 1″, and with orifice sizes ⅛, 3/16, ¼ and ⅜″.

REDUCES INSTALLATION COST

A lower cost, complete customer service is available with either the elbow type body or the meter bar construction. The S250 is the perfect companion for the new compact meters. Capacity of the S250 Series is 250 CFH or more, with or without internal relief. It is suitable for upstream pressures up to 100 psi and springs are available for reduced pressures from 3½″ W.C. to 15″ W.C.

WRITE TODAY FOR BULLETIN NO. P-S250



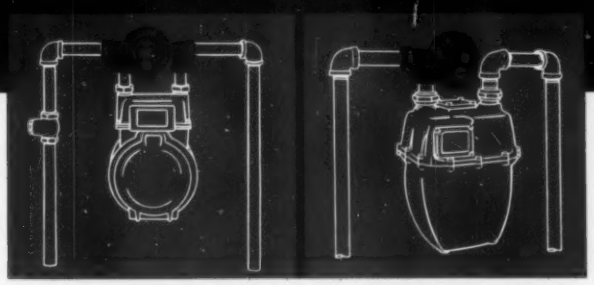
FEATURES OF THE S252

1. Emergency relief valve post for positive opening action (patent pending).
2. Full capacity internal relief valve (exceeds code requirements).
3. Rugged, precision-machined internal parts.
4. Aluminum body and casings for strength, easy handling, low shipping costs.
5. Elbow type body for installation economy.
6. Both valve disc and orifice are renewable through inlet.
7. Full size ¾″ weatherproof monel screened vent for high capacity relief (four primary positions available).
8. Spring-loaded nylon check valve, stainless steel seat.

FISHER

SERIES

S250



LOW COST INTEGRAL METER BAR HOOK-UP

PERFECT COMPANION FOR NEW, SMALL COMPACT METERS

GEM MEMBER

IF IT FLOWS THROUGH PIPE ANYWHERE IN THE WORLD... CHANCES ARE IT'S CONTROLLED BY...

FISHER GOVERNOR COMPANY

Marshalltown, Iowa / Woodstock, Ontario / Rochester, England

BUTTERFLY VALVE DIVISION: CONTINENTAL EQUIP. CO., CORAOPOLIS, PA.

FISHER® Controls

SINCE 1880

is behind other nations in developing a comprehensive national energy program. While the European Coal and Steel Community, the Soviet Union, and more recently, Canada, have taken steps to define their long-range energy aims, we have, to quote the Paley Commission, found it "hard to realize there are limits to our nation's material resources, and that for some materials we are approaching those limits."

Noting this failure, William R. Connole of the Federal Power Commission recently commented:

"The need for a national energy policy seems so patently obvious that I am simply unable to understand how thoughtful people concerned with this business can overlook it. . . .

"When we think that our energy resources are consumed at such an incredible rate that, for an example, all the fossil fuel consumed in the history of the world up to the year 1900 would last only five years at today's rate of consumption, we know how important this whole subject is to all the peoples of the world."

The accelerated pace of our national growth and the increasing pressure of international economic competition will demand a greatly expanded national energy base in the years ahead.

By 1980, surveys predict, our population will stand at approximately 250 million persons.

Resources for the Future, Inc., estimates that in the period 1955-1975, there will be an increase of 120 per cent in the use of hydroelectric power, 107 per cent in natural gas, 95 per cent in oil, and 75 per cent in bituminous coal.

By the year 2000, U. S. energy industries must be prepared to supply twice the amount of energy currently being consumed. And despite predictions concerning the development of super-sources of energy, authorities state that in the year 2000 nearly 80 per cent of America's power needs will still be furnished by coal, oil and gas.

While experts agree that coal presents the most optimistic reserve picture of all fossil fuels (2200 life years at current consumption rates) arguments continue as to the extent of our oil and natural gas reserves.

On the basis of current known findings, discounting future discoveries, authorities estimate U. S. oil reserves at 12.7 years. The comparable figure for natural gas is 22.9 years.

But the experts are not agreed on the limits of future U. S. oil and gas discoveries. A report of the Catawba Corp. of New York, a research organization specializing in services to exploratory oil companies, offers one of the most recent views on this subject. Among the report's conclusions:

The U. S. has 36.7 billion bbl of proved petroleum reserves, including natural-gas liquids, while world reserves are 285 billion.

U. S. industry would have to develop 150 billion bbl of additional reserves—more than four times existing reserves—in order to meet national needs in 1980.

U. S. demand is expected to rise at a cumulative annual rate of 3.5 per cent a year, while world demand will go up 5 per cent.

In recent testimony before a Congressional Committee, Federal Power Commissioner Arthur Kline described U. S. natural-gas reserves:

"In this country most of our proven (gas) reserves, estimated to total 254 trillion ft at the close of 1958, are dedicated to meet the requirements of existing pipelines. Any substantial future expansion of the industry must be based on reserves which have not yet been discovered. While most authorities seem to feel there is but little question that we shall be able to find these reserves, and estimate ultimate recoverable reserves of this country at figures varying from 1100 to 1700 trillion ft, there are other eminent authorities who seriously question these estimates, and the manner in which they are made, and express doubt that this country will discover as much gas in the next 15 years as in the past 15 years."

The inequity of the household gas customer paying to subsidize fuels market competition is but one part of the over-all gas industry problem. A corollary aspect is the steady increase in gas rates in recent years. On the West Coast, the industry is already faced with serious difficulties concerning rate increases, and the problem threatens to become nationwide in scope.

The U. S. oil industry is also confronted with the prospect of steadily rising production costs. W. C. Schroeder, Professor of Chemical Engineering at the University of Maryland, declared that the "increased cost of finding and producing petroleum in the United States has been apparent for a considerable number of years."

Schroeder cited a 1956 study by the Chase Manhattan Bank which indicated that the estimated average capital cost of oil production in the United States will increase from $6000 to $9000 per daily barrel between the periods 1950-55 and 1960-65.

Modern coal production facilities have enabled the coal industry to reduce its minehead price from $4.99 in 1948 to $4.86 in 1958.

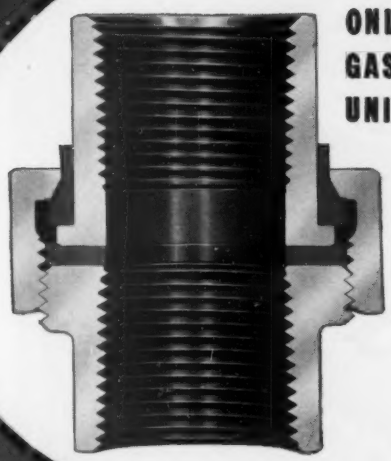
The prospect of increasing energy costs, pointed up by the experience of the gas and oil industries, was foreseen by the Paley Commission as a product of short-term fuels policies. Said the Commission:

"Rising cost means the diversion of more and more manpower and capital from other productive efforts to extract required materials, and total national output of goods and services will be smaller by the amount that this diverted manpower and capital might otherwise produce. Declining or even lagging productivity in the resource industries will rob the gains made elsewhere in the economy and thereby impair the very dynamic which has given the United States its growth. This is not the sort of economic ailment that gives dramatic warning of the onset; it creeps upon its victim with insidious slowness."

The national security aspect is present. As coal production has declined, so has the capacity of the railroads to haul coal. Within the past two years, the number of railroad cars available to transport coal has declined by 25,000.

The same basic problem exists in the domestic production of oil. Because of the time needed to explore, an estimated three to five years is needed to bring in one producing well. The time needed for pipeline construction would hamper the natural gas industry's

Continued on page 148



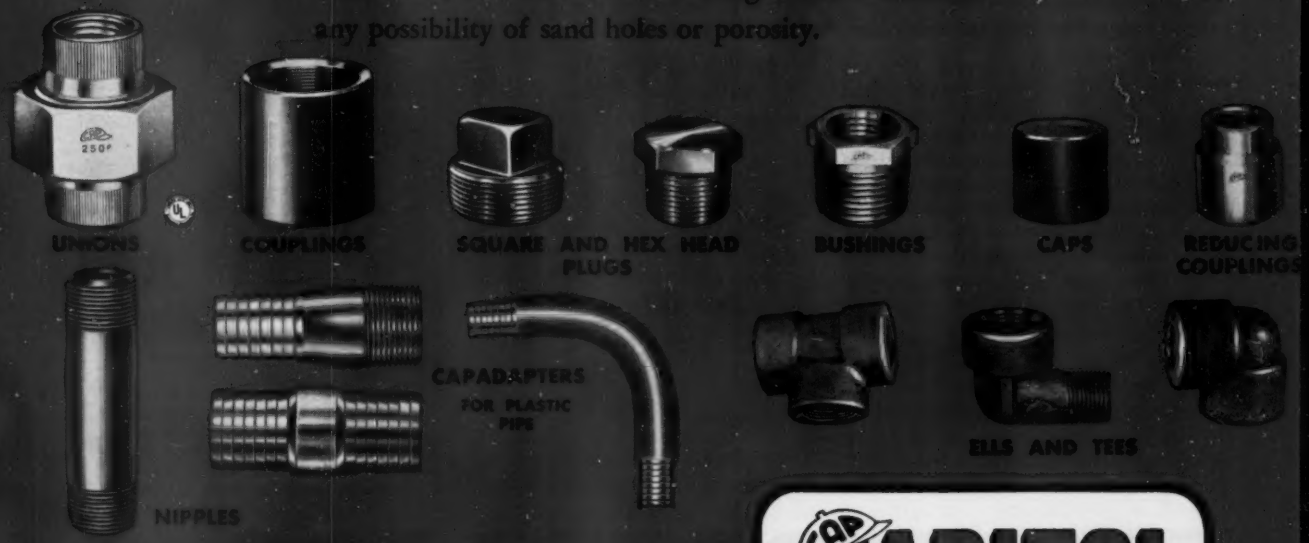
ONLY CAP GAS SERVICE INSULATING UNIONS HAVE ALL THESE FEATURES:

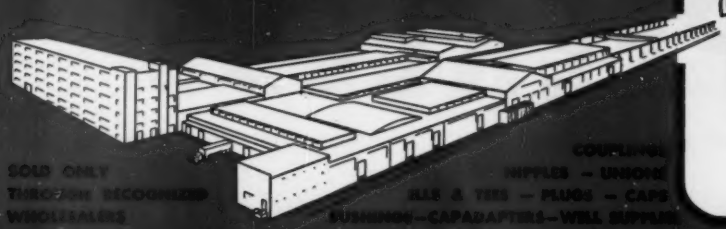
- Steel for strength and safety — no sand holes, no porosity
- Heavy Tapered Insulation — 3 times stronger
- Color Coded for proper temperature identification
- Phosphate coated for protection, for appearance
- Army-Navy gauging procedure assures full formed threads
- Cartoned to save time, reduce inventory loss

CAPITOL fittings for gas service

assure greater safety

Steel offers maximum tensile strength and eliminates any possibility of sand holes or porosity.



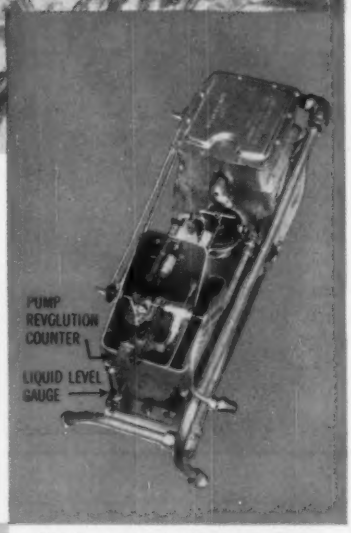


SOLD ONLY THROUGH RECOGNIZED WHOLESALERS

COUPLINGS — NIPPLES — UNIONS — ELLS & TEES — PLUGS — CAPS — BUSHINGS — CAPADAPTERS — WELL SUPPLIES

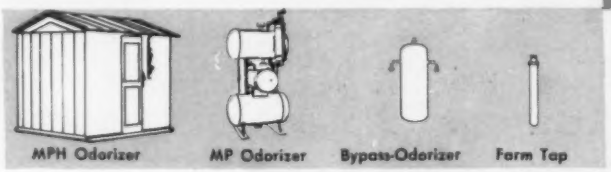
CAPITOL MANUFACTURING CO.
DIVISION OF HARSCO CORP.
COLUMBUS, OHIO

Over 1200 Peerless Gas Odorizers in service...



Peerless puts the right smell in gas . . .
from the largest odorizer to bypass or farm tap.

Heart of the largest Peerless meter type MP Odorizers is the internal mechanism shown at the right . . . pump revolution counter and liquid level gauge make sure of constant odorizing rate regardless of variations in flow, temperature and pressure. The skid-mounted odorizer station type MPH, in the illustration above at right is a complete packaged unit . . . quickly installed and ideal for locations where no noxious odors are permitted. For small loads there are the Peerless units shown below . . . including bypass odorizer and farm tap. For *all your gas odorizing needs* get in touch with your nearest Peerless Representative today.



Peerless Internal Mechanism above provides accurate control of odor into the gas stream. Unit is sealed in central vessel of Peerless Odorizer between odorant storage and safety tanks. Tempered glass windows in "O" Ring closure provide visibility to counter and gauge.

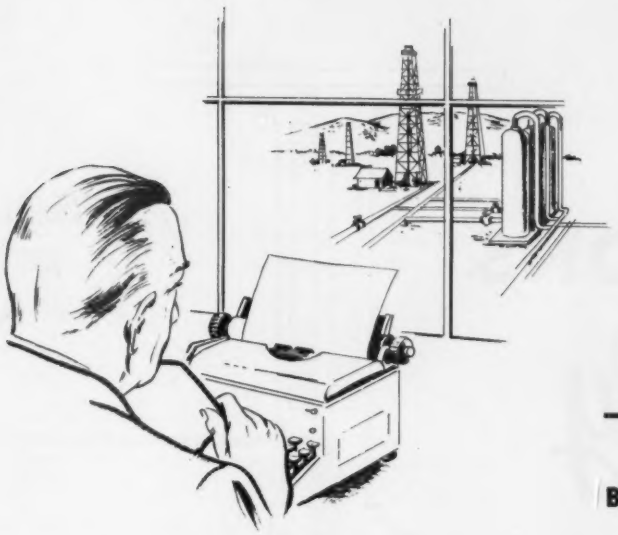
SEPARATORS: Liquid Vapor
DUST SCRUBBERS: Wet and Dry Types
GAS FILTERS
GAS ODORIZERS
SILLERS CLOSURES
OTHER PRODUCTS: Engine Timers, Scraper Traps, Manways

PEERLESS MFG. CO. DALLAS TEXAS

PEERLESS MFG. CO.

Representatives in All Principal Cities

P. O. Box 13165 • Dallas 20, Texas



THE GASSING GAME

By Jim Clark, Gas & Oil Consultant, Houston

IF there is anything like an angry outcry from consumers of natural gas about rates in California, it certainly wasn't apparent at Governor Pat Brown's recent conference in Los Angeles.

In fact there was not a single consumer, as such, present at the well advertised open meeting. The situation apparently worried the chief counsel for the Public Utilities Commission, William Bennett. He called a surprise and unscheduled witness by the name of George Schlaff and introduced him as "the man we have all been talking about all day—a consumer."

It turned out that Schlaff was really not a genuine consumer—as such—after all. Really he was a former employee of the Federal Power Commission who served in the days when natural gas was a drug on the market and long line transmission companies were about as rare as helium gas fields.

Time and again Schlaff turned to the CIO-AFL representative, the governor's consumers counsel, and the representative of the State League of Municipalities, to urge them to do something about stirring up the consumer, to overcome the apathy about gas rates.

This seemed like an act of desperation to me. The witness, who was introduced as a typical consumer (as who isn't) was pleading with those who were in contact with the most people to arouse the consumers. It seemed that if there were really anything serious for consumers to get stirred up about, the Assembly Room of the State Building in Los Angeles would have been unable to hold the crowd. Yet not one single individual present was a simon pure consumer—a citizen there just because he wanted something done about his own rates, service, or the quality of gas.

Maybe consumers are able to recognize that in natural gas they have the world's greatest bargain and are willing to let it rest there. Anyway, when consumers have complaints, they will be heard—loud and clear.

That was one thing about the governor's conference that puzzled me, and a second was the assumption that gas producers are not regulated. Any gas producer in the business would be non-plussed to know anyone could make such an assumption. He knows he is completely regulated anytime he delivers gas from one of his wells to any pipeline for resale into interstate commerce. He has been yelling about regulation and has had an army of petitioners in Washington seeking some kind of relief.

There is the Harris bill, the Harris-O'Hara bill, and others to relieve producers of utility-type regulations. The oil trade press is screaming with protests of what it calls undue producer regulation. Producers, royalty owners, and spokesmen for the government of gas producing states have been clamoring about the unnecessary utility-type controls on gas producers. Yet, in Los Angeles in a public hearing, sponsored and presided over personally by the governor, and attended by representatives of producers, transmission companies, and distributors, it is assumed that gas producers are inadequately, or even completely, unregulated. No one spoke up to correct the impression, so the governor and his panel are left with it. And the testimony at that hearing could be influential, not only in action taken by the State of California, but in national politics when party platforms regarding producer regulation are written.

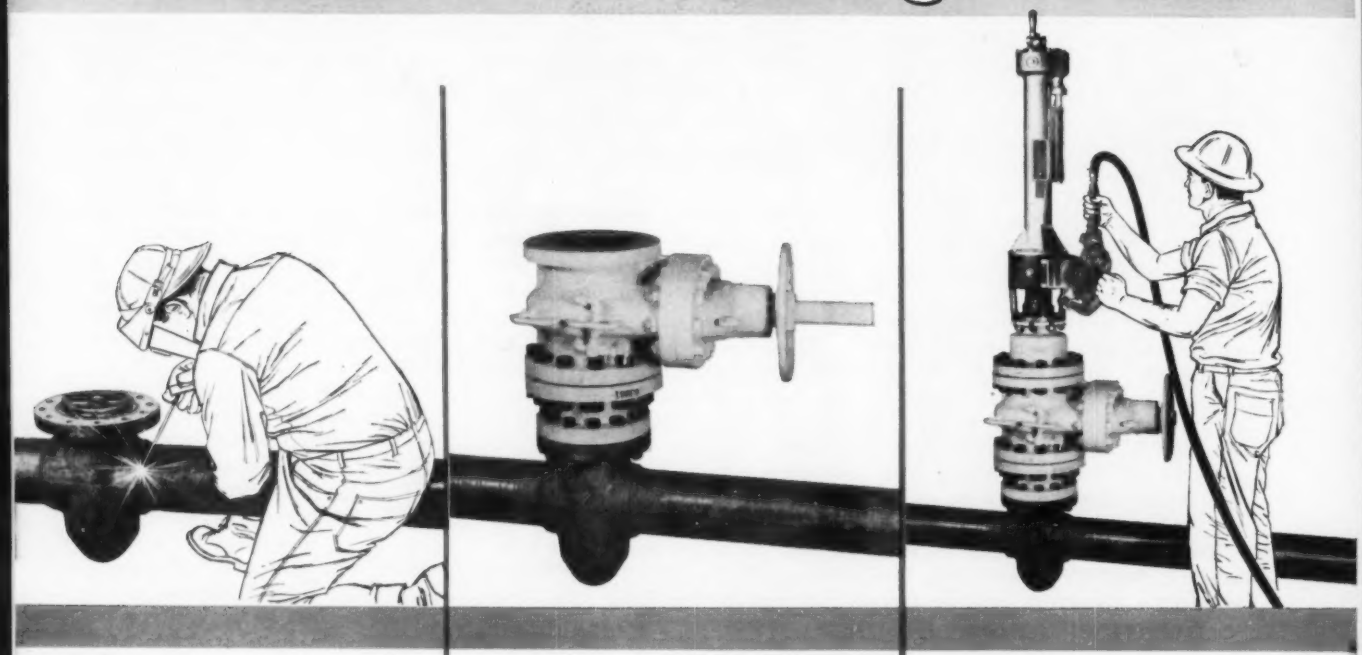
Of course, to anyone familiar with the situation it is obvious that the greatest unnecessary cost gas consumers are burdened with is the cost of producer regulation. This cost is not simply that of the red tape, delay, and nuisance involved, but the ever mounting cost of gas under regulation occasioned by the increasingly successful efforts of producers to find intrastate markets, thereby removing gas supplies from the interstate market to force additional competition and ever higher prices.

If that fact had been introduced into the Los Angeles meeting and pursued to the extent possible, there could have been some real accomplishment in the field of getting lower consumer prices for gas. ■

. . . without interrupting service

ISOLATE LINE SECTIONS Safely

. . . without gas blowing



STEP 1 Weld line stopper fittings to piping. Weld Save-A-Valve Drilling Nipples to piping to provide equalizing and purging connections.

STEP 2 Align special gate valves and bolt securely to line stopper fittings. Attach small gate valves to drilling nipples.

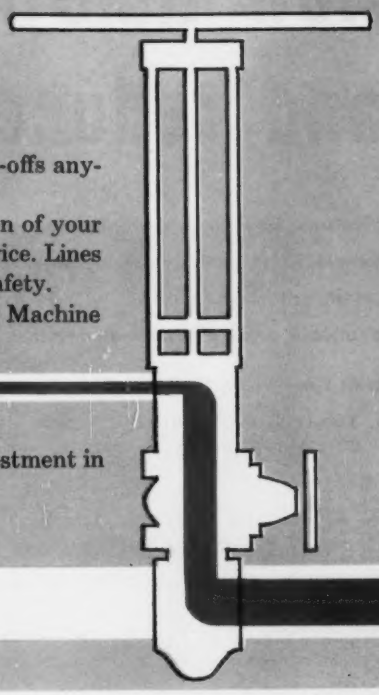
STEP 3 Bolt drilling machine to valve. Cut out sections of pipe to accommodate stoppers. Close valve and remove machine. Make cuts through drilling nipples.

MUELLER® NO-BLO® METHOD

■ Here's a simple step-by-step method for making fast, effective stop-offs anywhere in your line with Mueller Line Stopper Fittings and Equipment.

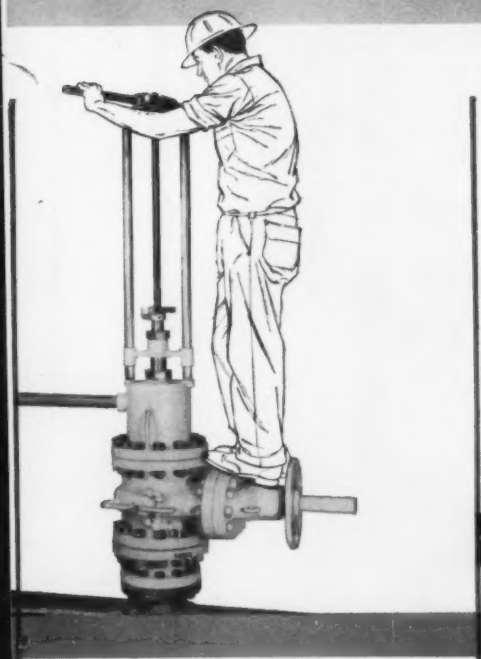
By making two such stop-offs and using a by-pass line, any section of your distribution system can be completely isolated without interrupting service. Lines and loops may be tied in, leaks repaired or fittings replaced in absolute safety.

A by-pass connection built into the body of each Mueller Stopping Machine

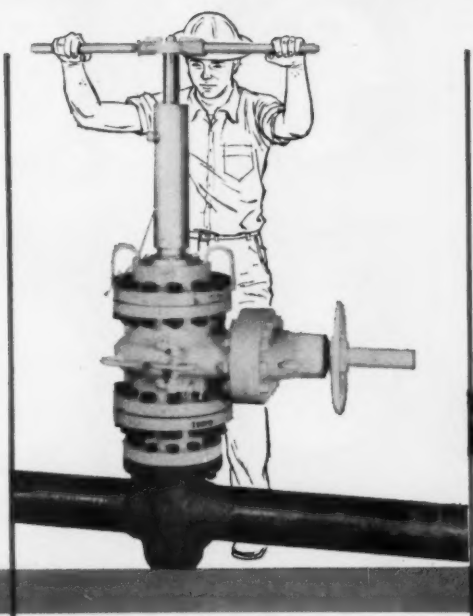


makes it easy to install a temporary by-pass line with a minimum investment in time and materials. If desired, a separate by-pass line may be used.

Write for complete information.



STEP 4 Bolt stopping machines to valves. Connect by-pass and equalizing piping and divert flow. Make stop-offs. Section of piping now isolated for repair, replacement or tie-in.



STEP 5 Close valve and remove stopping machines and by-pass. Install completion plug in top of fittings with completion machine.

STEP 6 Remove all equipment. Bolt completion caps solidly to line stopper fittings. Cap drilling nipples.

MUELLER CO.
DECATUR, ILL.

Factories at: Decatur, Chattanooga, Los Angeles
In Canada: Mueller, Limited, Sarnia, Ontario.

Mueller Line Stopper Fittings and Equipment may be used on lines up to 12" in size at pressures as high as 500 p.s.i. on most models and temperatures to 250° F.

GEM Sponsor

4380

New time multiplexing and remote and reduce line requirements for

Five new basic time multiplexing systems—and a new remote index setting feature—add to the overall versatility of *Dur-O-Pulse* . . . give you advantages available in no other telemetering system.

With Time Multiplexing Units—

- You can transmit up to 15 signals either in one or two directions over a single channel.
- You can add intermediate stations without adding any additional transmission lines.

With Remote Set Index—

- Easy to set—set the index, push a button and the rest is automatic: a pulse whose duration is directly proportional to the value of the set point is transmitted to remotely located controllers.
- Can be used as part of a multiplexing system.

The *Dur-O-Pulse* system measures and transmits process variables such as pressure, temperature, flow, level, voltage, current, power and speed. It can send data quickly and accurately over all types of circuits.

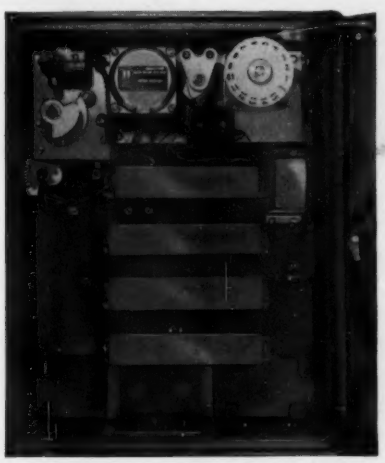
set index setting simplify operation Dur-O-Pulse telemetering systems

- Gives you set point indication at transmitting and receiving instruments.
- A single tone is required for the index signal when audio tone multiplexing is used.

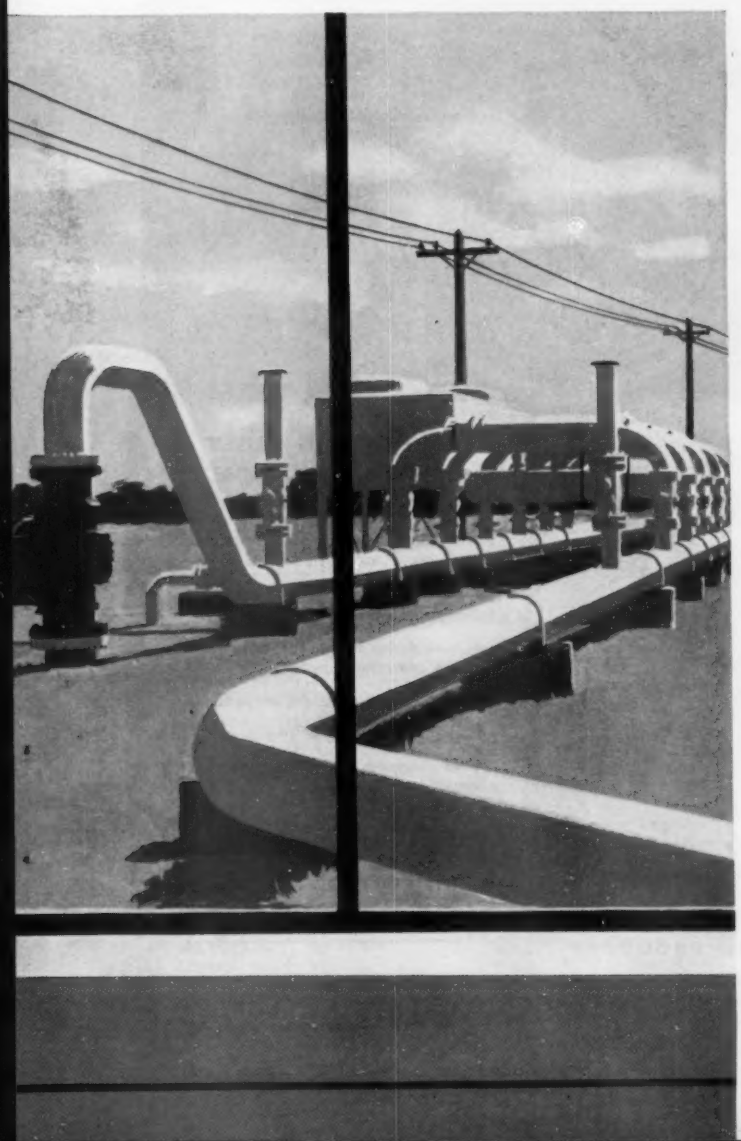
Find out about *all* the performance and maintenance advantages of *Dur-O-Pulse* from your nearby Honeywell field engineer. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa. In Canada, Honeywell Controls, Ltd., Toronto 17, Ontario.

REMOTE-SET INDEX TRANSMITTER eliminates separate push buttons or switches needed to drive controller index up or down scale. To readjust controller index it is necessary only to adjust the indicating pointer to the desired set point and push the start button.



TIME MULTIPLEXING UNITS transmit up to 15 variables in one or both directions and provide a synchronizing signal to keep transmitting and receiving units in step.



75th YEAR
PIONEERING THE FUTURE

Honeywell

First in Control

SINCE 1885

SPOTTY HEAT
The old fashioned wood or coal-burning stove generated plenty of heat but most of it was wasted . . . went straight up the flue. To keep warm, you kept close.

BASIC . . . but better than ever today

WARMTH WHEREVER YOU ARE . . . Thanks to modern gas distribution gas heat is evenly distributed, instantly available and responsive . . . comfort at the touch of a thermostat.

Two of the many features of cast iron pipe that make it ideal for expanding gas systems are its established quality and dependability. To provide both, U. S. Pipe controls every production step. From mining of raw materials to finished product, all U. S. Pipe is checked and rechecked for quality. This added care and precision in manufacture is one more reason for U. S. Pipe performance and dependability in service. Where it counts!

SERVICE IS BUILT INTO CAST IRON

- Standardized mechanical joints are bottle-tight for usual gas distribution pressures . . . and for all types of gas.
- Centrifugally cast pipe is tough, strong and uniform.
- Joint design allows for deflection during and after installation.
- Service connections are easily made.
- Long life a matter of record.
- No shortages. Cast Iron pipe is immediately available.

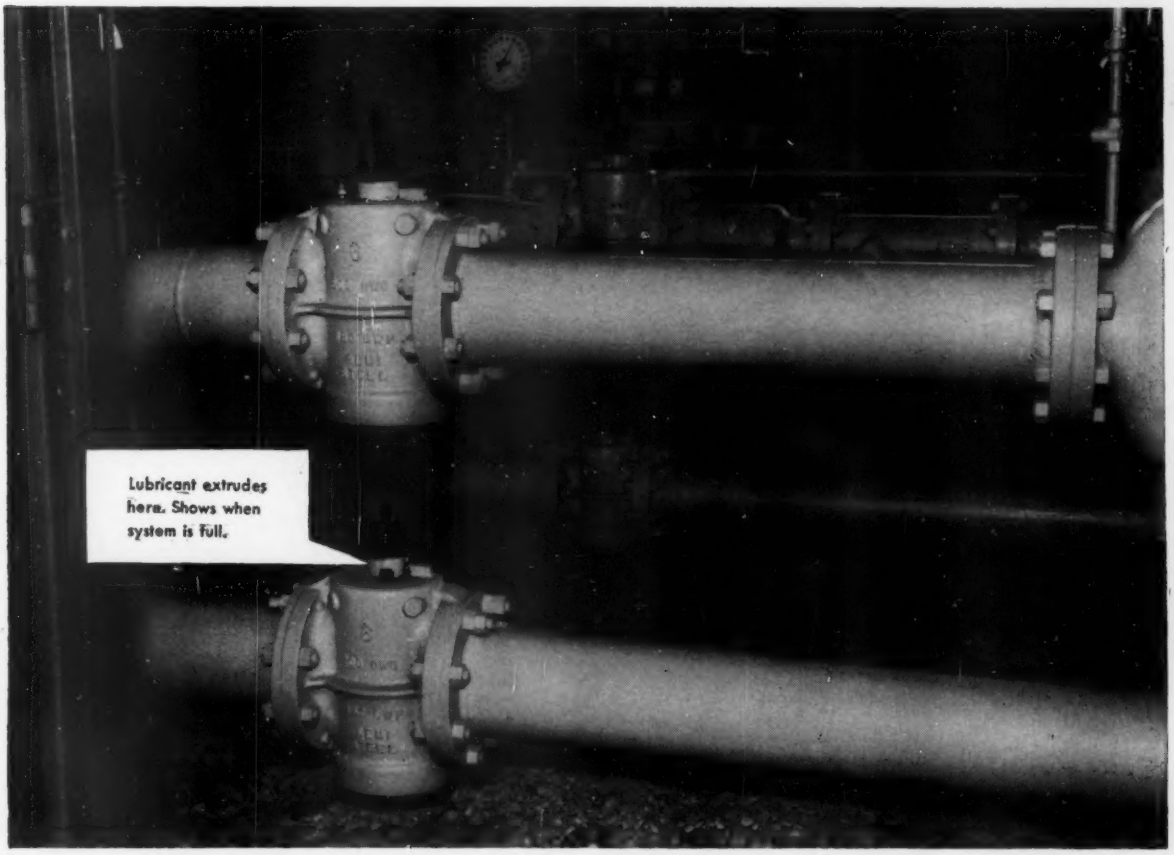
U.S. cast iron PIPE
CAST IRON

U. S. PIPE AND FOUNDRY COMPANY
General Office: Birmingham 2, Alabama

GEM Sponsor

A WHOLLY INTEGRATED PRODUCER
FROM MINES AND BLAST FURNACES TO FINISHED PIPE.

YOU GET DEPENDABLE VALVE SERVICE from HOMESTEAD® Lubricated Plug Valves. Their controlled high-pressure lubricant system (plus very close tolerance between plug and body) guarantee



positive shut-off without extrusion of lubricant into the line where it might clog orifices, meters or low-pressure lines. Instant operation is assured, too, because sticking is prevented by piston-like movement of the plug during lubrication. And to make sure that all the benefits are in *every* Homestead Lubricated Plug Valve, *each one is tested before and after lubrication.* For full information, send coupon.

hv

HOMESTEAD VALVE MANUFACTURING COMPANY
P.O. Box 405, Coraopolis, Pennsylvania

405

Gentlemen: Please send me Catalog 39-1 and prices on Homestead Lubricated Plug Valves

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

Complete engineering and construction services for the gas industry

- *Design and Construction of gas plants, transmission lines and distribution facilities, for both natural and manufactured gas.*
- *Corrosion Control*
- *Industrial Relations*
- *Reports and Appraisals*
- *Recovery Plants, Extensions and Alterations*

Send for our booklet, "The Inside Story of Outside Help." Address: Dept. F, Ebasco Services Incorporated, Two Rector Street, New York 6, N. Y.

ENGINEERS · CONSTRUCTORS
EBASCO
BUSINESS CONSULTANTS

Accounting & Management Control · Business Management & Financial · Consulting Engineering · Design & Construction · Facilities, Community & Industrial Planning · General Management Consultation—Electric, Gas & Industrial Companies · Industrial & Management Engineering · Industrial Relations · Insurance, Safety & Pensions · Purchasing, Expediting, Inspection & Traffic · Rates and Pricing · Research · Sales, Marketing & Public Relations · Taxes · Valuation & Appraisal · Washington Office

NEW YORK • CHICAGO • DALLAS • PORTLAND, ORE. • SAN FRANCISCO • WASHINGTON, D.C.

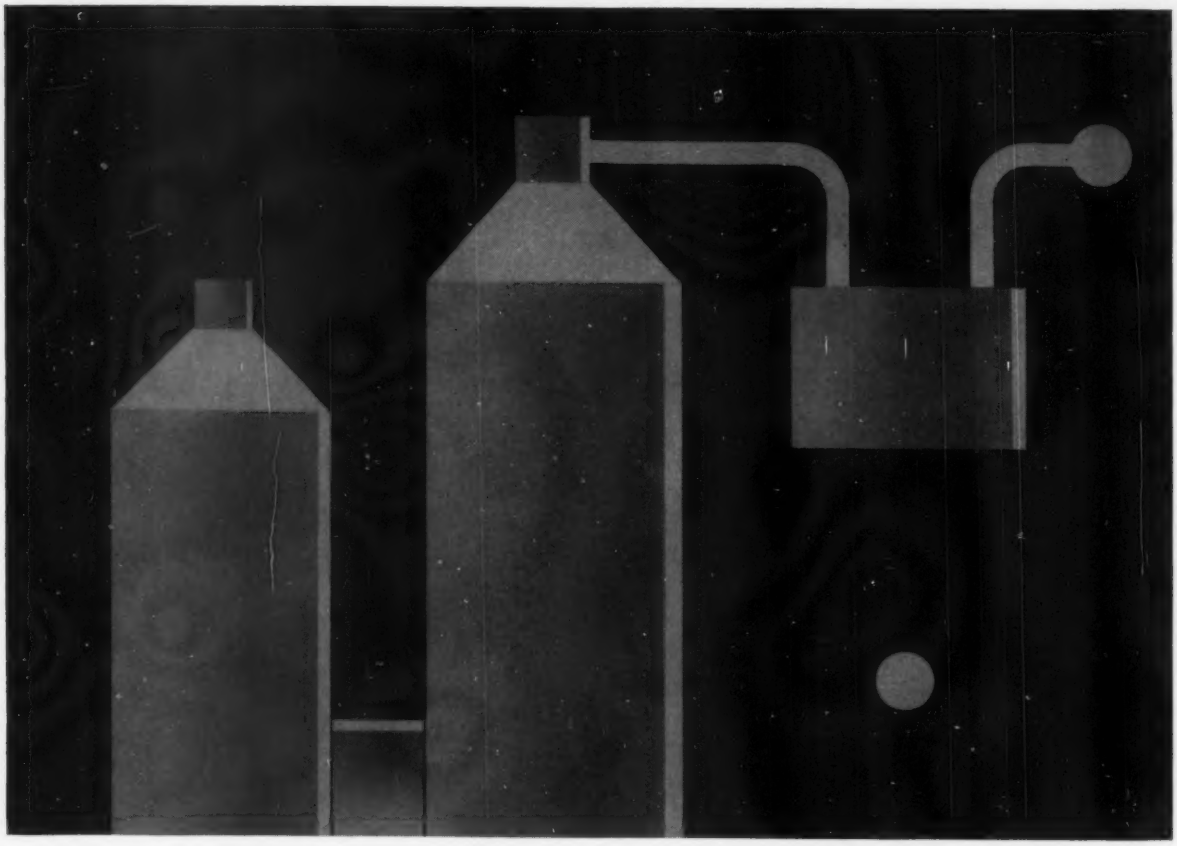
CLAMPING BELL JOINT LEAKS

SKINNER-SEAL

BELL JOINT CLAMP

When you clamp a bell and spigot joint, you want PERMANENCE. In the SKINNER-SEAL Bell Joint Clamp, massive malleable iron construction, gasket SEALED by stainless steel band, oversize corrosion-resistant bolts . . . combine to make a tight, lasting, completely reliable installation. Four-page folder with drawings, photographs, specification tables, sent free upon request.

M. B. SKINNER CO., SOUTH BEND 21, INDIANA



Get flexibility and economy from peak load facilities

Looking for economical ways and means to supplement your gas production for peak load demands?

United Engineers has developed a thermal oil-gas set of unusually high efficiency. The unit has an exceptionally high capacity and delivers a very acceptable gas, together with good tar. It can utilize feed stocks ranging from diesel oil to gasoline. And the product permits a high degree of interchangeability.

United Engineers is uniquely qualified to help you select the stand-by equipment suited to your anticipated needs. You may need a reliable LP gas plant, a high Btu oil gas apparatus—or a high-capacity UGI Cyclic Catalytic Reforming (CCR) Unit. Whatever your requirements, our background of 75 years' experience, plus our services and facilities, assures you of maximum return for every dollar expended.

UNITED ENGINEERS

& Constructors Inc • U.E.&C. (Canada) Ltd. • New York • PHILADELPHIA • Chicago

Ten 20-ft. lengths of rigid pipe after being coupled. Two workmen did this job in only 20 minutes!

Workmen joining two sections of 1¼" rigid pipe.

ARIZONA PUBLIC SERVICE COMPANY SAVES 50% WITH

RIGID PIPE

made of ABS Plastic

RIGID PIPE GAS SYSTEM INSTALLATION OFFERS NEW PROOF OF SUPERIORITY OVER CONVENTIONAL TYPE

Big news for happy housewives in Gila Bend, Arizona—the convenience of gas utility service for the first time! Important news for utility companies everywhere—the 50% savings over cost of conventional pipe gained by use of Anesite rigid ABS pipe made of CYCOLAC throughout the system! Saved precious man-hours, too! Arizona Public Service Company completed the job in record time . . . insured a failure-free system with this lightweight, leak-proof, AGA-approved pipe. Another example of better service . . . bigger savings from rigid plastic pipe in vital municipal installations!

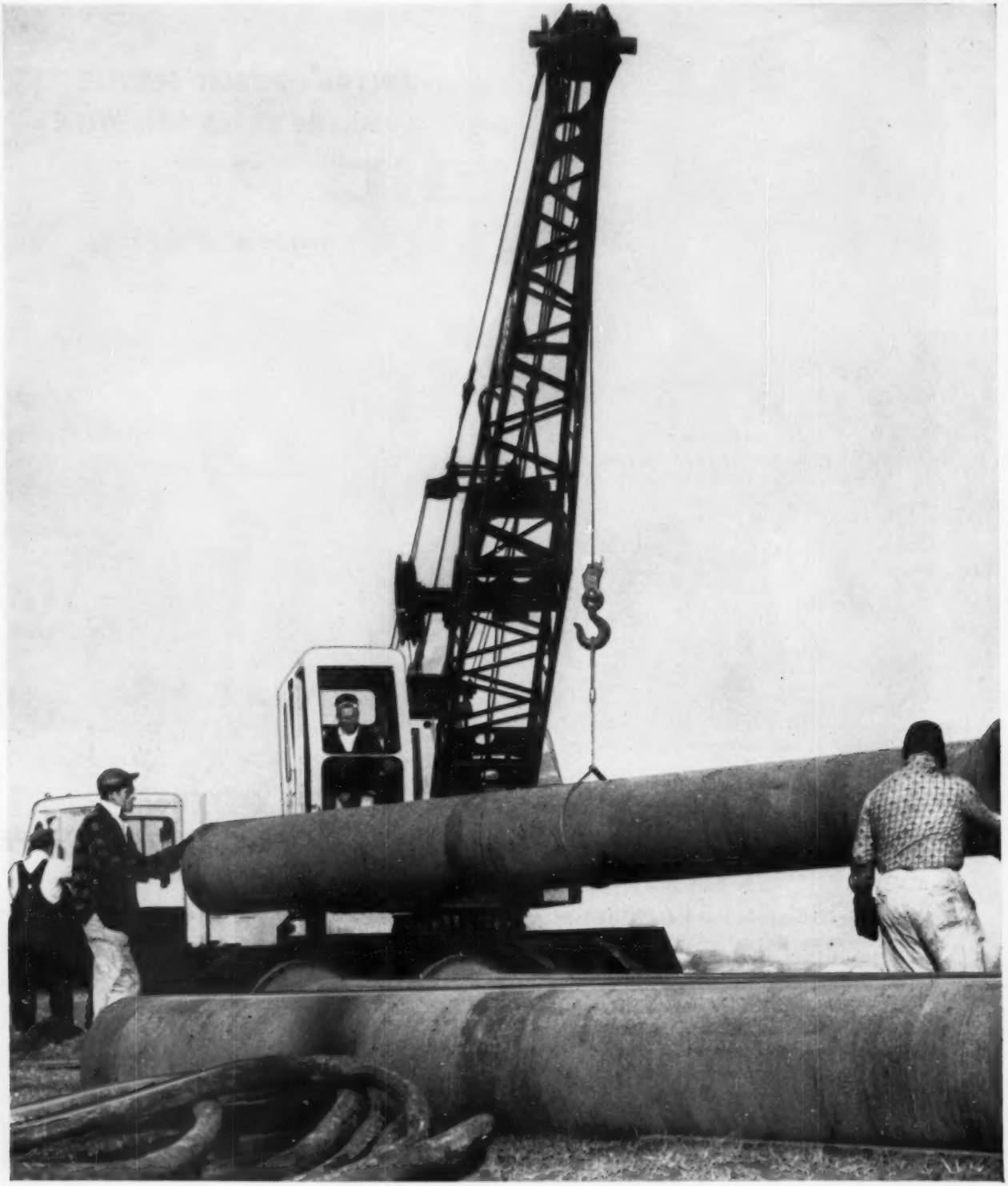
BE *ABSolutely* SURE . . .
INSIST ON RIGID ABS PIPE
made of
CYCOLAC®
THE BORG-WARNER PLASTIC THAT IS TOUGH, HARD AND CORROSION-RESISTANT

Write for the name of your nearest supplier

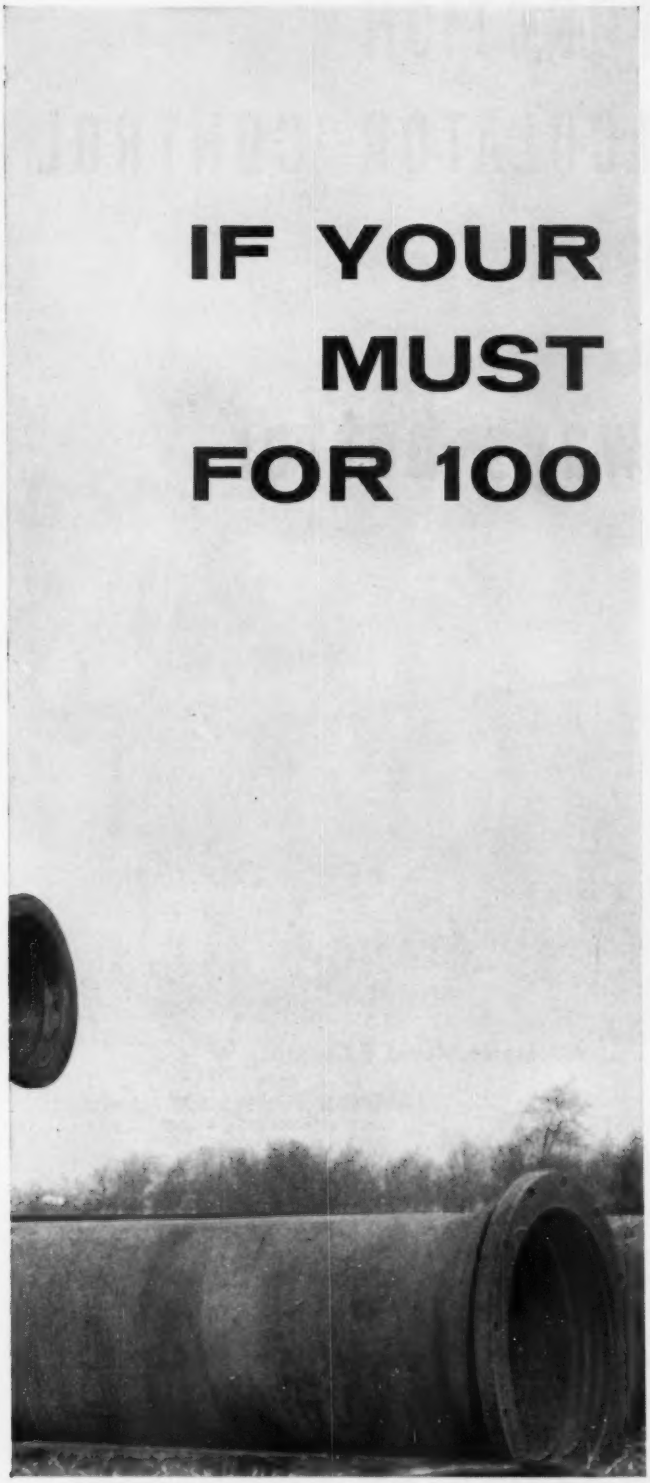
MARBON CHEMICAL
WASHINGTON

MARBON CHEMICAL
BW
BORG-WARNER

DIVISION **BORG-WARNER**
WEST VIRGINIA



THE MARK OF THE 100-YEAR PIPE



IF YOUR DECISION MUST STAND UP FOR 100 YEARS...

Rely on cast iron pipe. Gas utility executives throughout the country know they can depend on cast iron pipe. Here's why:

- Cast iron pipe is inherently rugged; its tough construction offers service-free efficiency for years.
- Once cast iron pipe is in the ground, *it stays there!* Forty-five American cities are still using cast iron gas mains that were installed over a century ago.
- Modern mechanical joints remain tight under normal distribution pressures.
- Cast iron pipe withstands all the usual stresses to which underground pipe is normally subjected.

Save—with cast iron pipe

Although original estimates might indicate that other pipe is initially cheaper than cast iron pipe, there are other considerations! Cast iron pipe's durability and corrosion-free service make for *real* savings over the years!

Cast Iron Pipe Research Association, Thos. F. Wolfe, Managing Director, 3440 Prudential Plaza Chicago 1, Illinois

...good reasons for <u>you</u> to choose

CAST IRON PIPE

MULTI-FUNCTION WILCOLATOR CONTROL

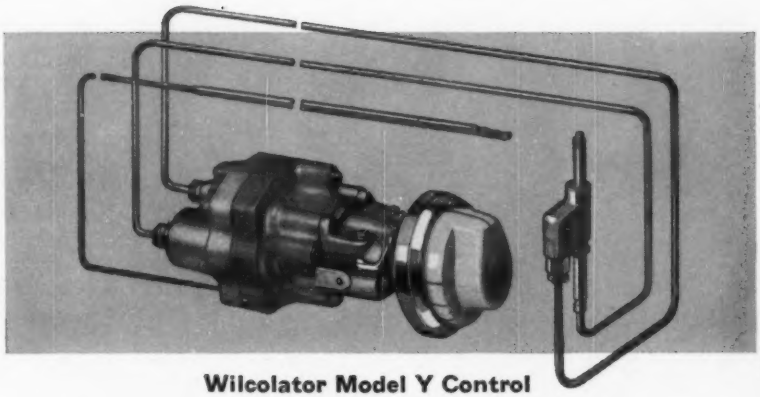
is 4 ways better

1 Lower installed cost

2 Positive safety shutoff

3 Smaller, more compact

4 Simple construction, easier to service



Wilcolator Model Y Control

Temperature range:
200-500°F, plus broil

AGA rating, Btu/hr:
Manufactured gas—43,045
Natural gas—63,700
LP gas—136,000

The Wilcolator Model Y thermostat is a high-capacity unit delivering top efficiency as a gas valve, automatic pilot, oven temperature control, and pilot filter. Its advantages (shown above) add up to dollars-and-cents savings.

The Model Y is designed to be installed quickly and easily on any gas range . . . with a minimum number of fittings. At the same time, it is extremely easy to service because of its simplified construction and the fact that adjustments can be made from the front of the range. It is also available with filtered top burner pilot takeoff which eliminates a separate pilot filter. Throughout, the Model Y reflects the benefits of Wilcolator's 35 years' experience in the thermostatic control field. It is described in detail in Wilcolator's Bulletin 568 — copies are yours for the asking.

Thermostats for Every Heating and Cooling Application

THE Wilcolator COMPANY

THE WILCOLATOR COMPANY
1001 NEWARK AVE., ELIZABETH, N. J.
In Canada: Wilcolator (Canada) Ltd.
221 Evans Ave., Toronto 18, Ont.

Ford 801 Series Powermaster tractor with heavy duty front end, Ford Extra Heavy Duty loader, Ford 12' backhoe.

FORD PRODUCTIVITY REPORT

Robert Rogers, owner
Handy's Trucking Co.,
Wallingford, Conn.

"I put a quarter-yard power digger in dead storage after I got my Ford"

Mr. Rogers reports: "I've had 5 years of backhoe work, and this Ford beats them all. I've got a truck-mounted cable type digger I can't even afford to use any more. The Ford works almost as fast, and doesn't cost near as much to operate. And I can take the Ford into places the bigger rig can't even go. I've got another tractor backhoe, too, but it doesn't compare with Ford. A job that takes 12 hours with the other backhoe, for instance, takes me about 8 hours with Ford. On this sewer job here, Ford will save me at least $75. I like Ford's undercutting, too. Went under a water main on this job and didn't shovel a wheelbarrow full of dirt. Never tear up a sidewalk any more. The only thing I can find wrong with Ford is that my other backhoe isn't one of them. And believe me, it soon will be."

Ford Motor Company

TRACTOR AND IMPLEMENT DIVISION • FORD MOTOR COMPANY • BIRMINGHAM, MICHIGAN

FORD CAN BE YOUR STAR PRODUCER, TOO . . . See your dealer soon!

COPYRIGHT 1960, FORD MOTOR COMPANY

Ford 1801 Series Industrial diesel tractor with Ford Super-Duty loader

FORD PRODUCTIVITY REPORT

George Kalinovik, manager
National Coal and Oil Co.,
Detroit, Michigan

"My Ford loaded 10,000 tons of coal last year—fuel cost about 2¢ a ton"

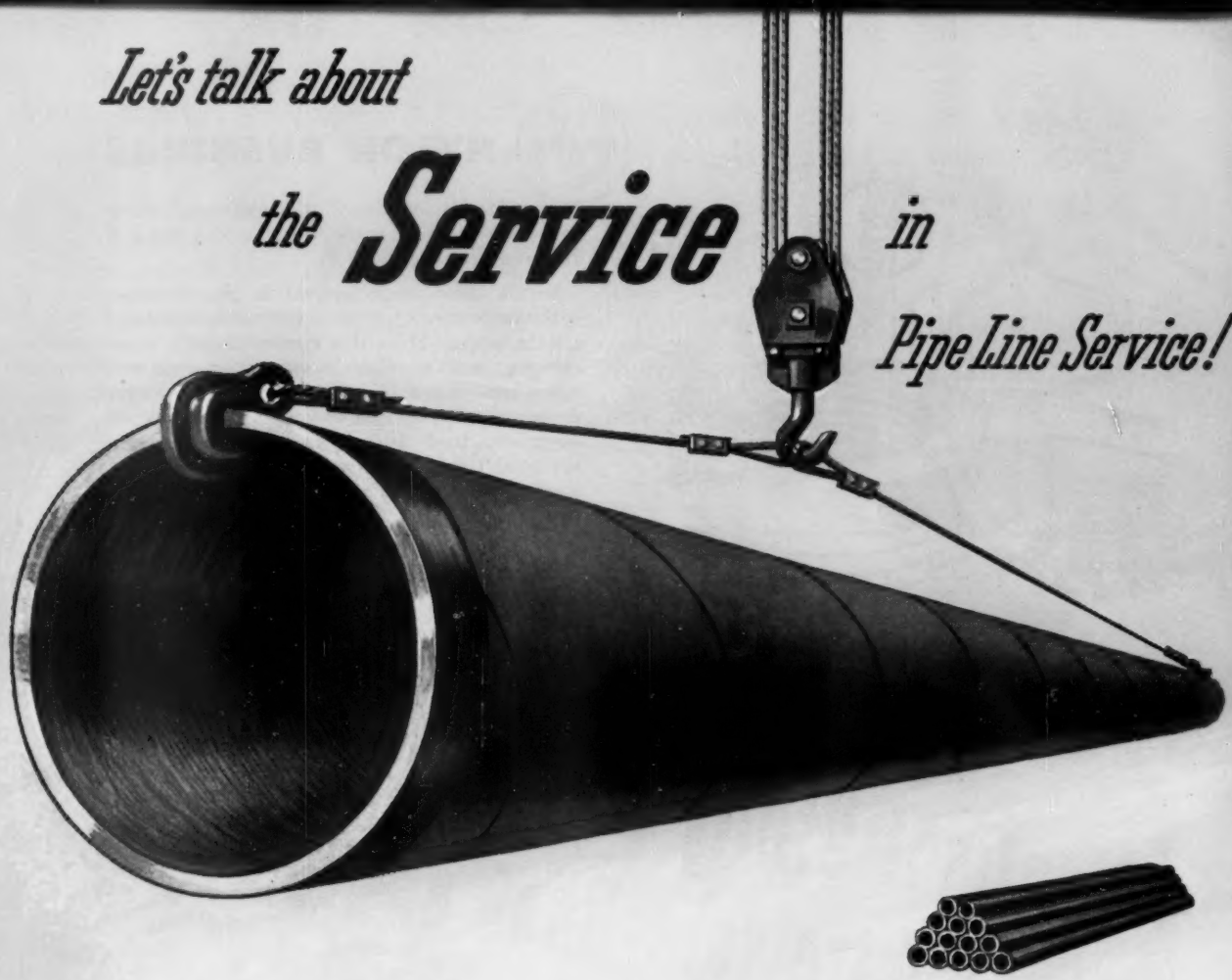
Mr. Kalinovik reports: "We load from 15,000 to 20,000 tons of coal a year—over half of it by loader into trucks or conveyor hoppers. This figures out at roughly 33 tons a day, from one to two hours of actual tractor work, and fuel for my Ford is about a gallon or 16¢ worth an hour. I can do five times as much work with the Ford as with my old loader. It's a much bigger bucket, and more important to me, power steering makes handling easy even where trucks have cut ruts in the yard. With the old loader, my arms got so tired they'd be shaking after I worked for a while. We load high-sided trucks we couldn't even reach before without a conveyor. We push rail cars wherever we want them. We even use the loader as a jack to change truck tires. We get all this with Ford—speed, big capacity, high dump, easy steering and low fuel cost. What more could you ask?"

Ford Motor Company

FORD CAN BE YOUR STAR PRODUCER, TOO . . . See your dealer soon!

COPYRIGHT 1960, FORD MOTOR COMPANY

Let's talk about the **Service** *in Pipe Line Service!*



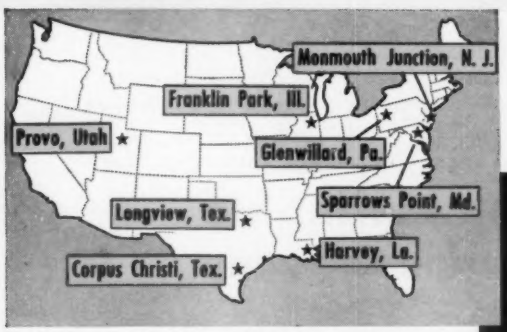
A company doesn't become a leader through quality of product alone. Although Pipe Line Service through the years has proved consistently that quality depends on coating and wrapping under controlled plant conditions, *service* is half the battle.

By service, we mean storing your pipe at plants strategically located near your sources of supply . . . and large storage facilities to allow you to purchase pipe when delivery is most favorable. Your pipe will be held in storage until needed—and then coated under the PLS high standards of uniformity. You *always* get a freshly applied coating job at the time pipe is ready to be laid. And PLS will ship your protected pipe *where* you want it . . . *when* you want it!

All this, *plus* the service of a PLS representative when needed. It's his job to help you in the proper handling, storage and laying of PLS protected pipe, to give you the maximum return on your investment.

This combination of quality *and* service assures you of the finest in pipe protection. On your next coating job call in your nearest PLS representative—you'll find that he can save you time, trouble and money.

There's a PLS plant strategically located to serve YOU!



Also sales offices at

Atlanta, Georgia
Dallas, Texas
Lincoln, Nebraska
Houston, Texas

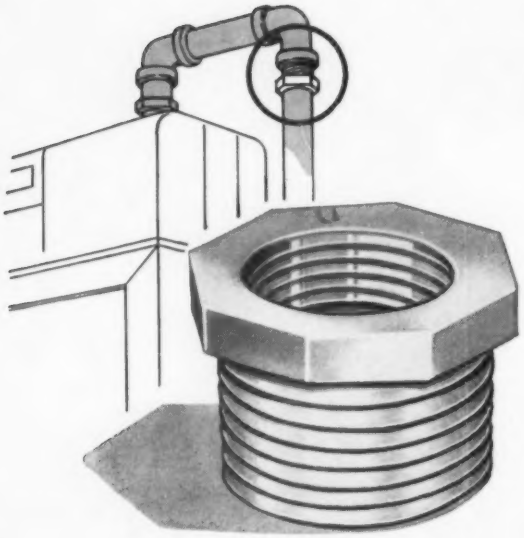
PIPE LINE SERVICE CORP. SERVICE EQUIPMENT MATERIALS FRANKLIN PARK - ILL.

Pipe Line Service Corporation

FRANKLIN PARK, ILLINOIS

Quality pioneers in coating and wrapping pipe for a quarter century

GEM



U-BRAND NYLON BUSHINGS

. . . used to insulate distribution systems at meter loops are precision-made, tough and withstand temperatures over 300° F.

When a distribution system is placed under cathodic protection, a small current is impressed on the piping. Since this current doesn't know one pipe from another—it travels up each and every service line. This results in either quicker deterioration of anodes, or you are buying excess electricity that drifts into customer's piping systems. This could also result in a number of shorts and/or grounds.

Protect your system. The proper use of U-Brand NYLON DIELECTRIC BUSHINGS and UNIONS (available in all popular sizes) can mean the difference between a costly interference problem or trouble-free service.

Attention! Utility Corrosion Engineers! Stop Electrolysis-Rust and Corrosion

BLACK U-COTE® MALLEABLE FITTINGS

■ A feature that is exclusively yours when you use U-Brand Black U-Cote Malleable Fittings. U-Cote is a dense, long-lasting, moisture-proof film that protects the fitting against rust and corrosion, acids, alkalies, electrolysis, steam, sun and heat. Black U-Cote Malleable Fittings are clean, easy to start and work with. And, they're available at no extra cost over ordinary-type fittings.

WRITE FOR SAMPLES . . . CONDUCT YOUR OWN TESTS

The Union Malleable Manufacturing Company

Ashland, Ohio • Vernon, Calif.

Manufactured in the U.S.A. SHIPPING DEPOTS IN PRINCIPAL CITIES ASSURES OVERNIGHT SERVICE SOLD THROUGH WHOLESALERS ONLY

THE TRULY VERSATILE COMBINATION GAS VALVE
VERSATROL . . . BY GENERAL CONTROLS CO.

A basic VERSATROL combination consists of the valve body and main line safety shut-off. Main gas cock, pilot valve and 100% safety are optional. Take your choice from four valve inlets and outlets (straight thru, bottom, 90 degrees left or right).

Then add a pressure regulator if you wish. Choose from a wide selection of automatic valve actuators . . . Solenoids, Hydranoids, Diaphragm Type either low voltage or millivoltage operation. All elements are independently removed, interchanged or added with only a screwdriver — an exclusive advantage for the installer or serviceman. Versatile VERSATROL — another design advance from GENERAL CONTROLS to make your work easier.

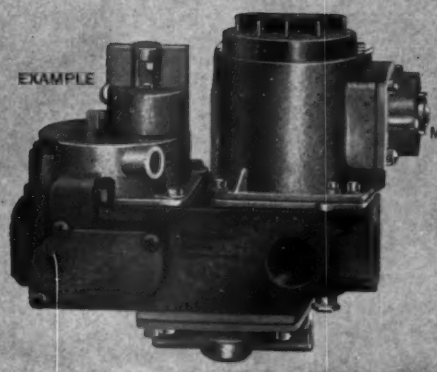
BE QUALITY SURE . . . ALWAYS SPECIFY GENERAL CONTROLS

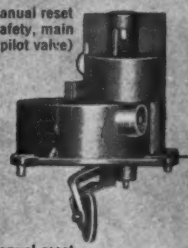
GENERAL CONTROLS

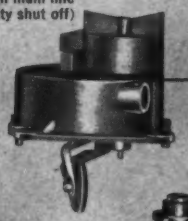
Automatic Controls for Product or Process

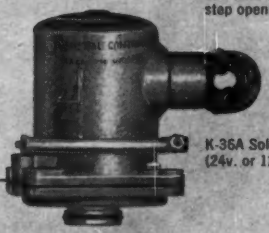
Glendale, Calif. • Skokie, Ill. • Guelph, Ontario, Canada

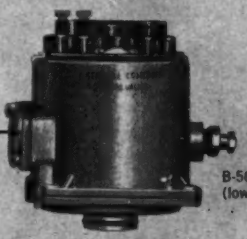
Nine Plants — 44 Factory Branch Offices Serving The United States Canada and Western Europe

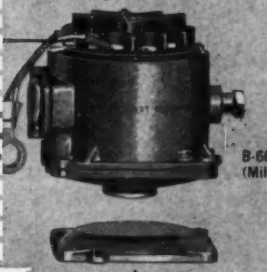






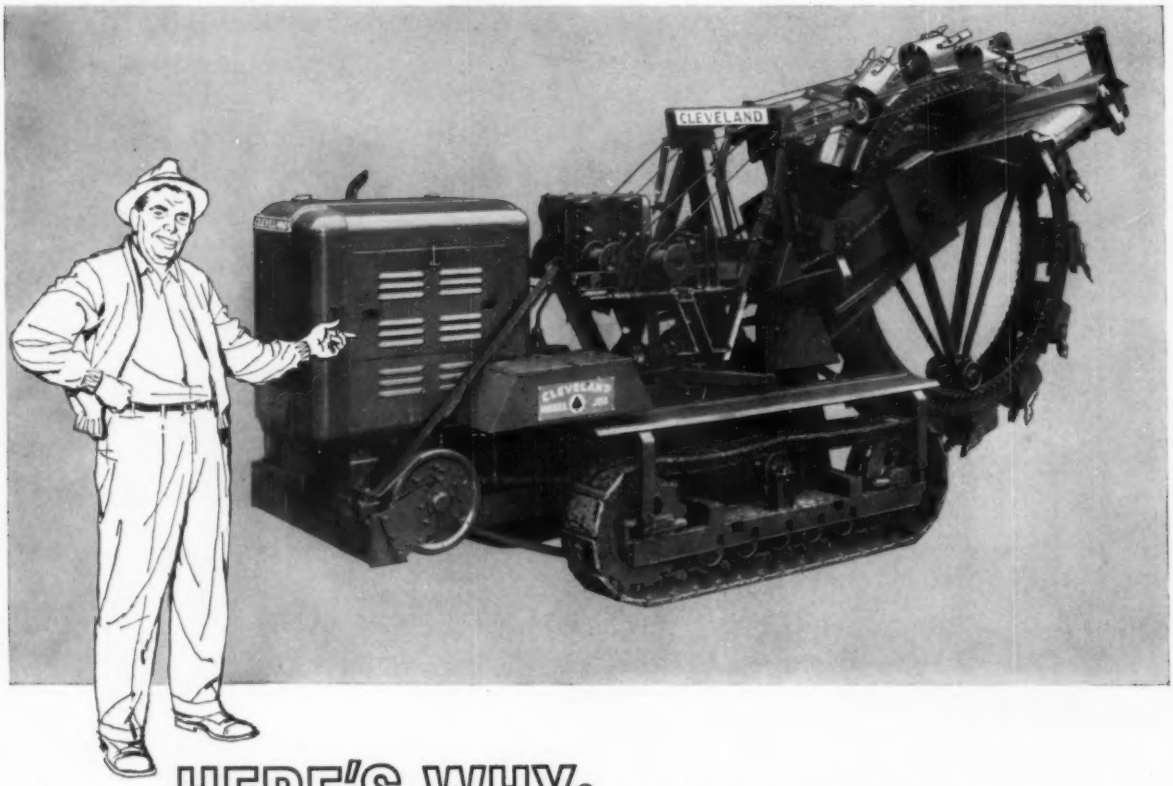






VERSATILE VERSATROL

THERE'S NOTHING LIKE THE CLEVELAND J-20 FOR DISTRIBUTION TRENCHING



HERE'S WHY: At his seat, the J-20 operator shifts the conveyor from side to side, controls the conveyor belt speed and direction, steers, hoists—in fact, has 100% control of every machine function. With the J-20 he maneuvers efficiently, sneaking by poles, trees, etc.... cuts trench as close as 18 inches from side obstructions... places spoil where desired... digs to precise grade and width in all soils... gets high daily production on services as well as mains.

THE CLEVELAND J-20 DIGS MORE TRENCH... IN MORE PLACES... AT LESS COST

Get the complete J-20 story from your distributor

The CLEVELAND TRENCHER Co.

Good Everywhere

20100 St. Clair Avenue • Cleveland 17, Ohio

THE *NEW* ROOTS 3000 cfh* GAS METER IS "JUST A BULGE IN THE LINE!"

*Size 3M125 ½ actual size

Gas men who've previewed it are mighty excited about the cost saving features of the new Roots-Connersville 3000 cfh rotary gas meter. Only 14" long, a workman can pick it up with one hand and carry it under his arm.

Because it incorporates the famous Roots rotary positive displacement principle, accuracy is permanently locked in for the long, trouble-free life of the unit. Actuated by the gas flow itself, twin rotors displace a fixed volume of gas with each revolution, unaffected by variations in pressure or flow. Extremely close clearances between rotors assure accuracy while eliminating all friction and need for internal lubrication. Occasional replenishing of oil is the only maintenance required under normal operating conditions.

Here, is *the* efficient and economical way to meter industrial, commercial and institutional gas loads. Call in your Roots-Connersville sales engineer or write for complete data.

- Replaces meters several times its size and weight
- Only 14" long—mounts in the line
- A bare 53 pounds
- Accurate to 3000 cfh and up to 125 psi
- Easily installed
- Direct reading or can be instrumented
- Quickly tested on standard equipment
- Virtually eliminates maintenance
- Requires no special supports

ROOTS-CONNERSVILLE BLOWER DIVISION
900 W. Mount St., Connersville, Indiana
In Canada—Roots-Connersville Blower (Canada), Ltd. • 629 Adelaide St., W., Toronto

ROOTS
first in air and gas handling equipment

DRESSER INDUSTRIES, INC.
OIL • GAS • CHEMICAL • ELECTRONIC • INDUSTRIAL

This photograph vividly demonstrates the excellent resistance of AMERICAN DUCTILE IRON® pipe to impact. After receiving the full force of a 3½-ton weight being dropped from a height of 25 feet, the pipe remains in one piece. The clearly defined puncture caused by the tip of the weight is an indication of the superior strength and impact resistant qualities of AMERICAN DUCTILE IRON ® pipe.

3½-TON WEIGHT DROPPED FROM 25 FEET FAILS TO SHATTER AMERICAN DUCTILE IRON® PIPE

Super-service requirements such as high internal gas pressures, heavy crushing loads and extreme shock loads can be met with extra-tough, bottle-tight AMERICAN DUCTILE IRON ® pipe. This pipe offers important advantages of both iron and steel, possessing the time-proven corrosion resistance of gray cast iron without the expense and inconvenience of special wrappings or special protective devices... and yet having high strength to withstand extreme installation and service stresses.

In crossing busy highways, under deep covers and fills, where shifting soil or earth settlement may be encountered... specify AMERICAN DUCTILE IRON ® pipe for gas service.

AMERICAN DUCTILE IRON ® pipe provides extra safety factors for all standard distribution pressures ... is easy to tap without saddles or welding... withstands shock in shipment, in installation, in service.

If you expect the extreme conditions, investigate AMERICAN DUCTILE IRON ® pipe. Your nearby American Cast Iron Pipe Company representative will furnish complete facts. Write for illustrated catalog.

GEM

AMERICAN
CAST IRON PIPE CO.
BIRMINGHAM ALABAMA

SALES OFFICES
New York City • Dallas
Chicago • Kansas City
Denver • Pittsburgh
Orlando • Minneapolis
Cleveland • Birmingham

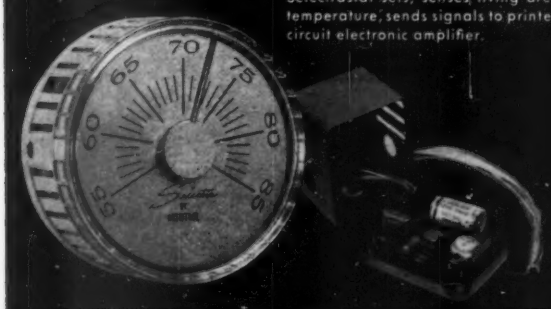
Dissatisfied homeowners . . . are taking notice . . . becoming buy-conscious

selecting furnaces . . . Selectra equipped . . . and enjoying true comfort

MAXITROL *Selectra*

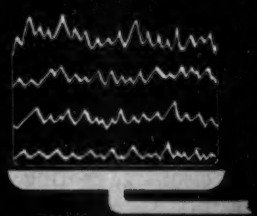
MAXITROL COMPANY • 12200 BEECH ROAD • DETROIT 39, MICHIGAN

Selectrastat sets, senses living area temperature, sends signals to printed circuit electronic amplifier.



Selectra valve does double duty as a regulator and as a modulator in response to power output of amplifier.

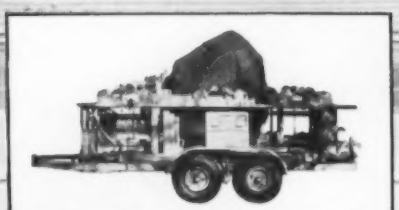
Selectra infinitely modulates flame from full input to 1/3 input. It's not just a "full fire —low fire" system.



SEEKING SALES STIMULATION? THEN SELECT SELECTRA!

NOW! A portable high-speed taping machine for Polyken

cleans, tapes and



In road-ready position, unit is compact and completely mobile. Comes on 4-wheel tandem trailer or on steel skids. With 80 feet of pipe-handling trackage.

New Polyken tape method handles ¾" to 4" pipe, cleans and coats 2,500 feet per hour and sets up anywhere

Probably the best thing about the Betzel taping machine and Polyken tape is the absence of all the nasty problems of hot dope. The highly mobile "Betzie," developed jointly by Polyken and A. E. Betzel, sets up in an hour (comes down in half the time).

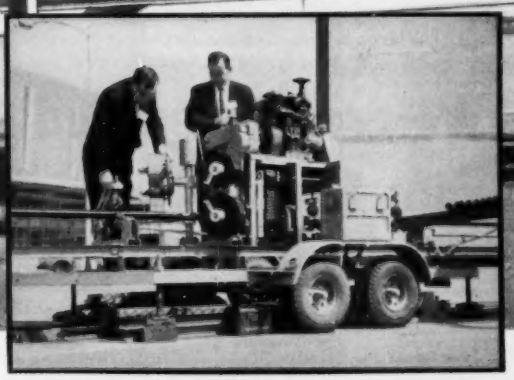
With only 6 men, or less, you run a continuous cleaning, coating and wrapping operation that processes 2,500 lineal feet per hour. Takes only 10 minutes to switch pipe sizes. And the savings? Well, just compare the time, labor, and small investment against the average hot dope operation.

The practical Polyken way

With Polyken tape you know the coating is always ready. Goes on factory-smooth, too. No primer, no drying or cooling time. No fumes or fire hazards.

What's more, permanent Polyken tape can take almost anything—as already proved by its many hundreds of miles and years of hard work. It's being used in such tough terrain as the

wraps city pipe jobs —on site!



As the pipe spins through the "Betzie," twin powered brush heads afford dynamic cleaning—as shown in this demonstration at the 1960 N.A.C.E. meeting in Dallas, Texas. Other standard equipment includes twin brake-type tape and outer wrap spindles for rapid change of rolls, and an adhesive attachment for fast-gluing outerwrap.

Iranian desert, Canadian cold, Florida swamps and southern California mountains.

For the full particulars on both machine and tape, look up your Polyken representative. Or simply send the coupon below.

©1960 The Kendall Company

THE MODERN WAY

Polyken®

EXPERIENCED IN PROTECTIVE COATINGS

THE KENDALL COMPANY
Polyken Sales Division

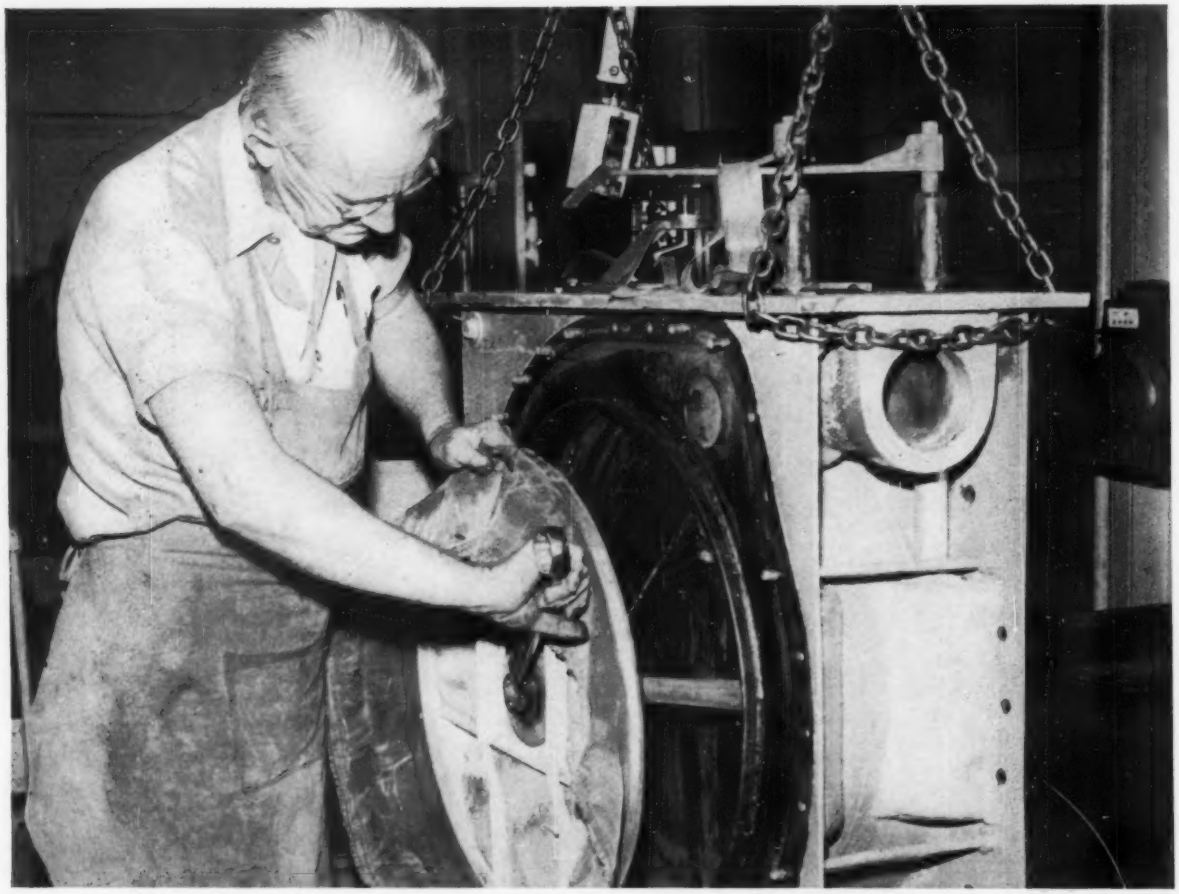
Polyken Sales Division, Dept. GM-8
309 W. Jackson, Chicago, Illinois

Gentlemen: Please provide me with information on the new Polyken pre-coating method using the Betzel tapester.

Name _____

Address _____

City _____ State _____



In large volume displacement meters—and in all types of meters—Ohio Fuel Gas Company relies on Reeves-Vulcan synthetic diaphragms for greater dependence, longer life and lower maintenance costs.

"We greatly reduced P.D. meter maintenance with Reeves-Vulcan synthetic diaphragms"

M. P. DeBaets, General Superintendent Gas-Measurement Department, Ohio Fuel Gas Company, Columbus, Ohio

"The frequent replacement of leather diaphragms required in large-volume, positive-displacement meters on gas wells," says Mr. DeBaets of Ohio Fuel Gas, "was, at one time, one of our major maintenance problems."

Problem: "When we were using leather diaphragms, the impurities in the wellhead gas would wash the oil out of the diaphragms, and diaphragms had to be replaced frequently. And cold weather aggravated the situation."

Solution: "About 6 years ago, we changed to Reeves-Vulcan synthetic diaphragms for these meters, as well as for industrial and domestic meters. Our experience shows that Reeves-Vulcan synthetic diaphragms last longer... withstand wellhead gas impurities...operate better at low temperatures... are not affected by odorants. What's more, since they require no oil, maintenance schedules have been extended."

Since changing to Reeves-Vulcan synthetic diaphragms, Ohio Fuel Gas reports substantial savings through reduction in meter maintenance and testings, and a much lower rate of diaphragm replacement. How about *your* metering efficiency?

There's a Reeves-Vulcan diaphragm for practically every type of gas meter made. Both molded and crimped styles are available in any volume. Order Reeves-Vulcan synthetic diaphragms from leading manufacturers or directly from:

REEVES VULCAN

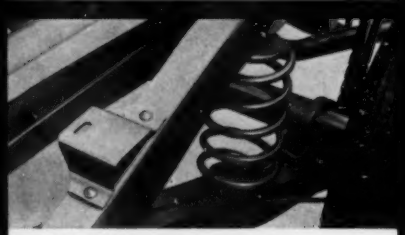
Reeves Brothers, Inc., Vulcan Rubber Products Division
1071 Avenue of the Americas · New York 18, New York

Chevy's major components for 1960 last up to four times longer than ordinary truck parts—exhaustive testing has proved it. Likewise, the totally new cabs have proved 67% more resistant to twisting; and new frames for many models are as much as eleven times stronger in torsional rigidity. These are typical 1960 Chevrolet truck facts and figures—and they point up a new kind of tough truck build that helps you hang on to your dollars!

Chevy's precision-balanced wheels run smoother. Balancing weight shows that all front wheels are balanced in assembly—an advantage no other truck offers. It's assurance of easy handling; that tires will last longer without shimmy and shake from wheel imbalance.

Chevy's new frames are built with new brawn. Box-section rail design is stronger than ever; rail section modulus has been increased as much as 33%. And massive front box-section crossmember adds to truck stamina; helps keep you going years longer at least expense.

Chevy's new torsion-bar independent front suspension saves maintenance, increases work output. Independently suspended front wheels step right over bumps; tough torsion bar springs soak up shocks. As much as 78% of all objectionable road shock is absorbed before it reaches truck body, sheet metal or driver!



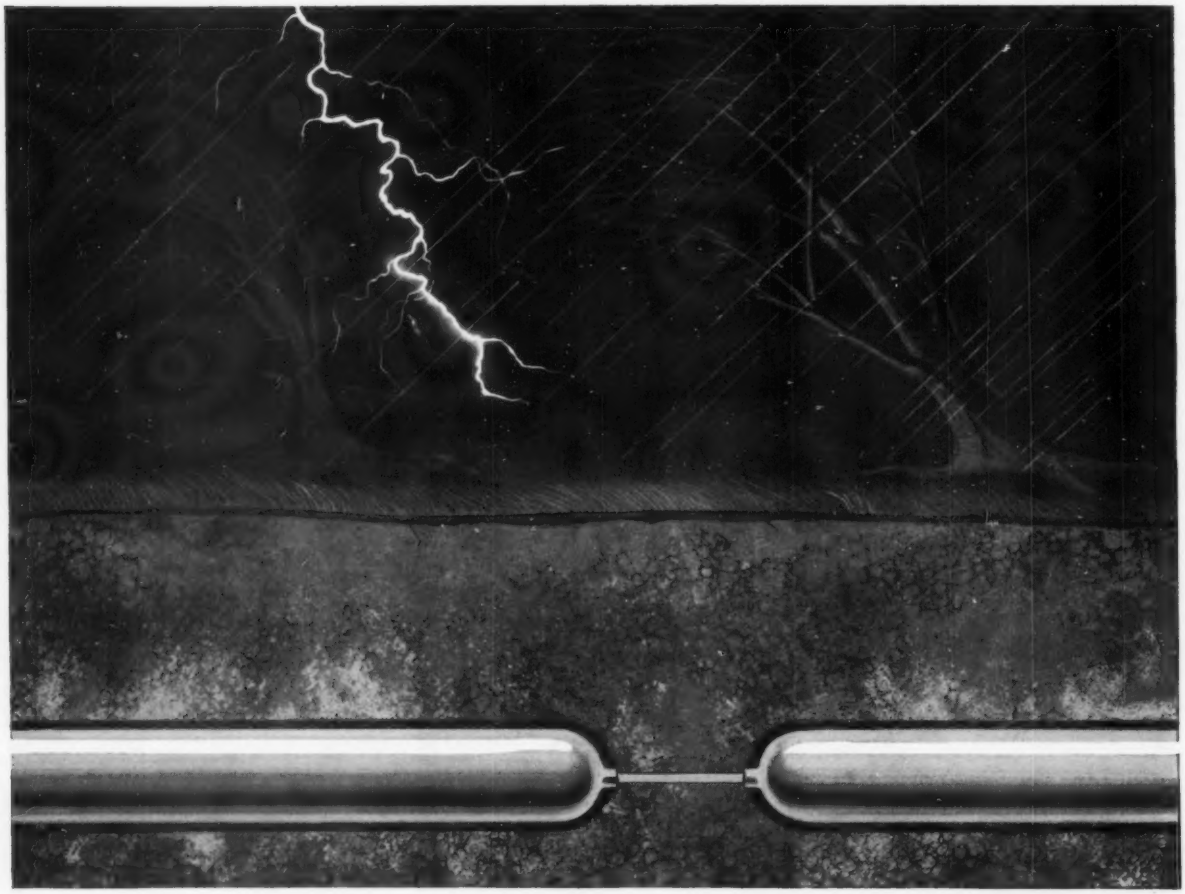
Chevy's easier riding rear springs help roll up profits. Frictionless coil springs cushion road shocks before they reach the frame. Spring capacity can be matched to the load for best riding qualities.

CHEVROLET'S BIG NEW BUILD IS LIKE MONEY IN THE BANK FOR YOU!

Here are just a few of the *many* ways in which Chevrolet's totally new build for '60 will work to build a bigger bank account for you. They show that a '60 Chevy means *profit* through longer life, less maintenance, easier working, outsized cargoes and extra economy! You'll find, too, that 1960's savingest truck *power* is Chevrolet's: famous economy 6's and efficient short-stroke V8's for light-duty models . . . high-power, high-torque V8's and tough, dependable 6's for the bigger trucks. It'll profit you to see your Chevrolet dealer about Chevy's big new build, sometime soon. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

1960 CHEVROLET STURDI-BILT TRUCKS

CHEVROLET



How to protect gas from lightning

Store gas underground in USS National Seamless Steel Bottles. Down there, gas is safe from wild storms and hurricane winds. Since National Seamless Steel Bottles are buried underground, atmospheric conditions have little or no effect. And maintenance costs are virtually eliminated—a big saving to the user.

Any bottle can be cut off the line for inspection or minor repairs —without bothering the gas pressure in the remaining groups of bottles. API Grade N-80 steel is used in these bottles. It has a minimum yield strength of 80,000 pounds per square inch. Generally, each bottle holds 26,000 cubic feet of natural gas at 2400 psi.

Write for our booklet on USS National Seamless Steel Bottles.
National Tube Division, United States Steel,
525 William Penn Place, Pittsburgh 30, Pa.

USS and National are registered trademarks

This mark tells you a product is made of modern, dependable Steel.

National Tube Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York

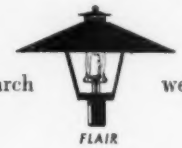
Gaslites are now a part of the American Scene

being a parent in the re-birth of the gas light industry lays

a pretty heavy responsibility in our lap: establishing and maintaining the quality standards

of this husky young giant.

Through research

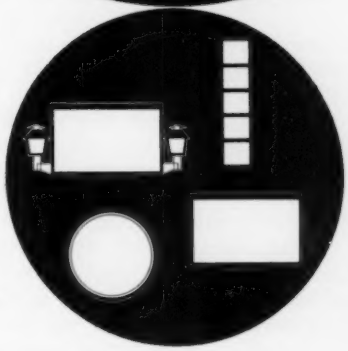


we've endowed our child with quality and styling

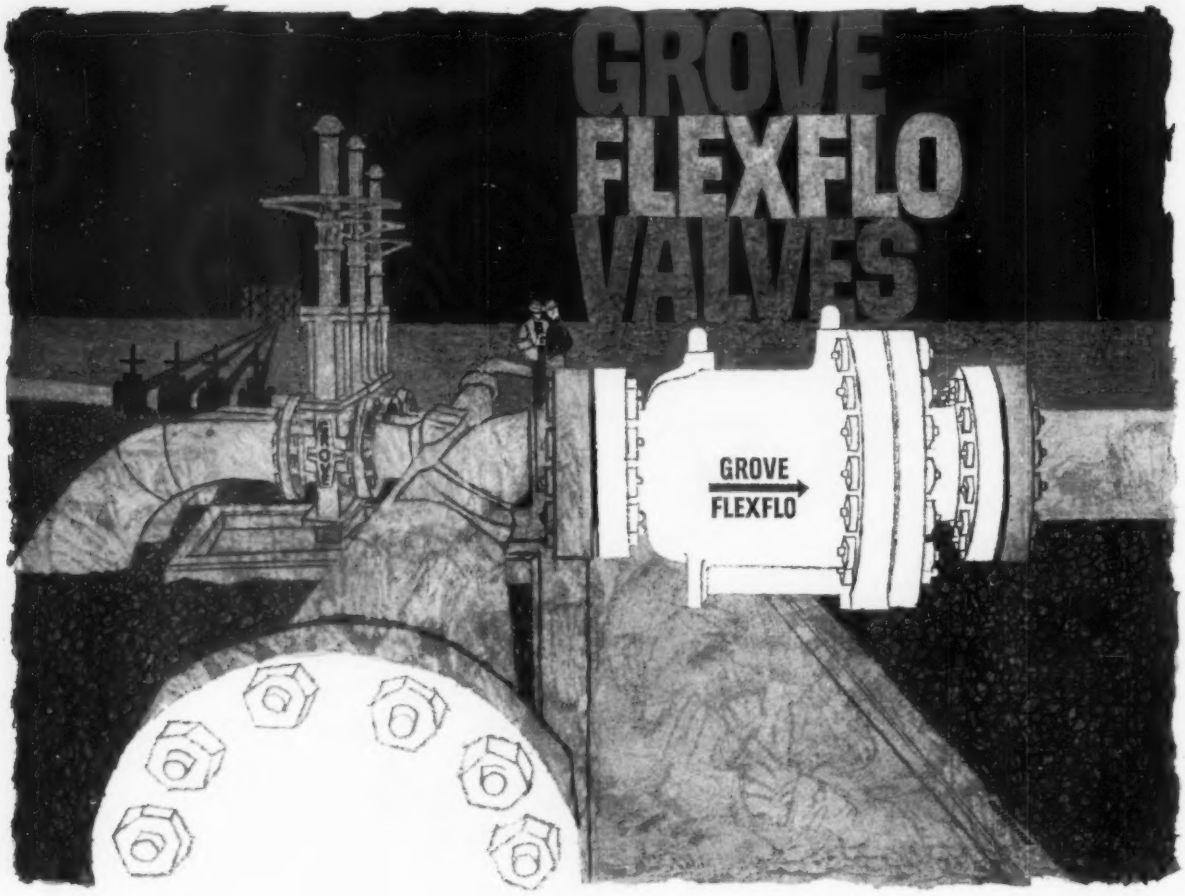
that has made him become again a part of the

American scene, and made him tops in sales and prestige.

maybe you'd like to meet another of our children — Gasigns by Arkla. Same family characteristics.



Arkla Air Conditioning Corporation • Shannon Bldg.
Little Rock, Arkansas



CHOICE OF EVERY MAJOR U.S. GAS DISTRIBUTION COMPANY

DEPENDABLE Assured by unique simplicity of design and construction. Only one moving part, a tough, resilient rubber tube that can never stick or wedge, serves as both diaphragm and valve.

QUIET There is no "slamming". The rubber tube silently rolls on and off the slotted metal body core. Actually, the quietest valve you can use.

VERSATILE Use for pressure reducing, remote control operations, back pressure control, automatic shut-off and manual open-shut flow control. May be self operated or used with electrical, pneumatic or hydraulic actuated pilots. Can handle gas, water, most petroleum products. Available in sizes 1" to 12", working pressures to 1500 psi.

write for technical data bulletins

GROVE VALVES

GROVE VALVE AND REGULATOR COMPANY
A Subsidiary of Walworth
6529 Hollis Street, Oakland 8, California
Offices in principal cities throughout the U.S.
In Western Canada: Grove Valve Ltd., Edmonton

6323

GAS

AUGUST 1960

An Editorial

Politics predominated California's gas conference

By J. FRED EBDON, Editor

• *Help, Harry, it looked rigged!*

IT was blistering hot in Los Angeles on June 21. In the Assembly Room of the State Building, it was blisteringly hot for natural gas producers and the Federal Power Commission. On that day, and in that setting, the Honorable Edmund G. Brown, Governor of the State of California, held a "Governor's Conference on Natural Gas Problems."

Those who were scheduled to make official appearances are shown in the accompanying box. There were the following exceptions: A Mr. Donald Vail, representing AFL-CIO, sat on the panel while State Sen. Hugh M. Burns did not. Mills Cox, president of Transwestern Pipeline Co., was unable to attend. However, a Mr. George Schlaff, representing I do not know what or whom, was able to attend and appear. Messrs. Vail and Schlaff were not listed on the day's "program."

At 9 a.m. the Assembly Room was hushed. The assembled people subdued. It was odd how the atmosphere of this place of officialdom—complete with WPA-painted murals picturing life, times, and industry in California before Disneyland — permeated beings present so that most conducted themselves with the zest one sees in expectant relatives at the funeral of their richest uncle.

The panel convened, participants found seats, legions of gas-industry public relations people ceased distributing copies of prepared talks, and the chairman rapped for order.

Those present were then told about some mysterious rising clamor from the public amounting to a rebellion by gas consumers against increases in natural gas prices. I say mysterious public clamor because no one ever put his finger on it. The local gas companies seem to be experiencing no massive public outburst against California Public Utilities Commission-set rates. Newspapers have not been laced with stories on the subject. (The executive editor of one major Los Angeles paper has said he never heard of the whole thing.)

Assembly Room itself seemed to lack consumer interest in California's "natural gas problems." Nearly all, if not all, persons gathered had either direct or indirect interest in a company or person scheduled to make an official appearance. Perhaps there was a pure, unadulterated gas consumer there. If so, I was never able to run him down. There were plenty of seats available. Public clamor, if any, was a will-o'-the-wisp variety.

Mr. Paul Kayser, board chairman of El Paso Natural Gas Co., and the first "witness," quickly showed that gas consumers in California are in pretty good shape. Price statistics from FPC records were prepared at Kayser's request by H. Zinder & Associates, independent consulting rate engineers and accountants, Washington, D. C., covering weighted average prices paid for gas in southern California, Chicago, Detroit, Brooklyn, and Atlanta. They clearly demonstrated that southern California's gas consumers are getting their gas at cheaper rates than is the average for the other areas studied. The upward trend of costs throughout the entire gas industry was also evident. These impartial facts were adequately ignored by the panel whose attentions, judging from their questioning, seemed to be drawn to two ideas Mr. Kayser expressed, and which were either misunderstood or purposely misinterpreted.

He tried to explain that independent producers, or wildcatters, are not of a genre that flourishes under regulation. They risk vast amounts of money in exploratory and highly speculative drilling ventures. The wildcatting type of person knows he will not make a strike every time he drills. He also knows he will go down the drain after a number of dry holes in a row. The reason he takes such high risks is that he wants to make a "little killing" once in a while. He does not care to earn some utility-type 6 per cent based on the cost of exploration and drilling for a well that came in. His philosphy is, and probably must be, to make this "little killing" after, usually, a series of dry holes. If he doesn't, he will take his money and effort out of wildcatting ventures and put them where he can make a more equitable return. In other words, producers will wildcat if they can extract some real profit from a strike in order to cover losses from drilling dusters; they will not wildcat for a closely regulated profit.

Mr. Kayser's "little killing" phrase was picked up by several panel members and bandied about. They were happy to have those words and tried to make some use of them.

GOVERNOR'S PANEL

EDMUND G. BROWN, Governor
State of California

WILLIAM M. BENNETT (Chairman), Chief Counsel, California PUC

MRS. HELEN NELSON, Consumer Counsel
Governor's Office

HUGH M. BURNS, State Senator, President Pro Tempore, Fresno County

EVERETT C. McKEAGE, President
California PUC

RANDOLPH COLLIER, State Senator
Chairman, Senate Committee on Transportation, Del Norte and Siskiyou Counties

RICHARD CARPENTER, Executive Director and general Counsel, League of California Cities

THOMAS M. REES, Assemblyman
Los Angeles County

ALAN SHORT, State Senator, Chairman, State Committee on Public Utilities, San Joaquin County

PERSONS PARTICIPATING

Morning Session:

PAUL KAYSER, Chairman of the Board
El Paso Natural Gas Co.

MILLS COX, President
Transwestern Pipeline Co.

STANLEY LEARNED, Chairman, Executive Committee, Assistant to the President, Phillips Petroleum Co.

FRED SEARLS, General Attorney,
Pacific Gas & Electric Co.

WILLIAM R. CONNOLE, Commissioner
Federal Power Commission

ROGER ARNEBERGH, City Attorney,
City of Los Angeles

Afternoon Session:

MELWOOD W. VAN SCOYOC, Public Utilities Consultant, Washington, D. C.

WILLIAM E. TORKELSON, General Counsel, Wisconsin Public Service Commission

ROBERT P. O'BRIEN, Vice President
Southern California Edison Co.

W. M. JACOBS, Vice President
Pacific Lighting Corp.

R. S. PETERSON, Vice President
Halsey, Stuart & Co., Inc.

DION HOLM, City Attorney, San Francisco
(represented by Robert R. Laughhead, Utilities Expert, City Attorney's Office, San Francisco)

Mr. Kayser then explained that competition among transmission companies for gas reserves in the same fields has driven field prices up, even under FPC regulation of natural gas producers. Governor Brown asked if this didn't amount to the same thing as: "There isn't any real regulation of natural gas producers." During discussion of this unique conclusion, I am sure several on the panel assumed that natural gas producers are not regulated. This would be delightful news to producers. I am sure that more than one of the governor's panel left the meeting with this feeling that natural gas producers are not regulated; for after this concept was generated, it was never set straight. That will give the gas industry reader a fair idea of the depth and validity of such conferences.

Paul Kayser has a way of charming people. His southern courtesy mixed with intellect and vivacity permit him to express himself more than adequately. He is not inarticulate.

His energy, bounce and charm began to infect the panel. At least, this is my conclusion. At that point, a question of time was introduced. Chairman Bennett, with some grace, permitted Mr. Kayser "three minutes more." By actual watch check, Paul Kayser was permitted less than 30 minutes to tell his story and present his opinions relating to California's "natural gas problems."

Significantly, I think, the matter of time for presentation came up only twice in the whole meeting. Once when time was actually called on El Paso Natural's chairman and much later in the day prior to the presentation by W. M. Jacobs, vice president of Pacific Lighting Corp. On the other hand, time was never mentioned or called on any participant representing an anti-gas industry, anti-FPC, or anti-producer point of view. As a matter of fact, Melwood W. Van Scoyoc was allowed to drone on with a particularly boring excoriation of FPC, the Administration, and gas producers for nearly an hour and a half. Mr. Bennett must have been unable to find his wrist watch while this one found much fault but offered precious little in the way of constructive remedy.

A they-should-have-listened-to-me story was interestingly presented by ex-FPC Commissioner William R. Connole. Chairman Bennett's introduction stressed that Connole often dissented with the conclusions of his fellow commissioners and was usually found correct by the courts. The worn-out tune about Connole as gas consumers' best and only friend on FPC was also played by Mr. Bennett and drifted lightly on the ears of the panel.

Connole gave a very excellent picture of the complex tasks the FPC has, with particular emphasis on the need for that body to: (1) establish basic principles for regulating producers' prices equitably, (2) put their shoulders to the wheel, and (3) write some decisions.

Most of what he said is well known to the gas industry through his previous talks and through acquaintanceship with his philosophy of regulation. Hence, it needs no repetition here. He did express a plea against destroying public confidence in regulatory bodies and regulated utilities. One can only be hopeful that Gov. Brown and the other panel members listened. However, Connole didn't appear to be spreading much of his confidence with his words.

Connole also called for experts, real experts, to man FPC. And he felt that the industry itself can produce some of this material. Most people will agree that men of ability never hurt a federal regulatory body, a state public utility commission, or even a governor and his staff, for that matter.

Connole repeatedly admonished the assembly "not to throw the baby out with the bath water." If there was a point relative to the purpose of this conference locked into that bit of colloquial saw, I failed to grasp it. I could only conclude, after listening to the ex-commissioner's talk, that if President Eisenhower felt the need to throw out some FPC bathwater, I am pleased that Connole was one "baby" that went out with it.

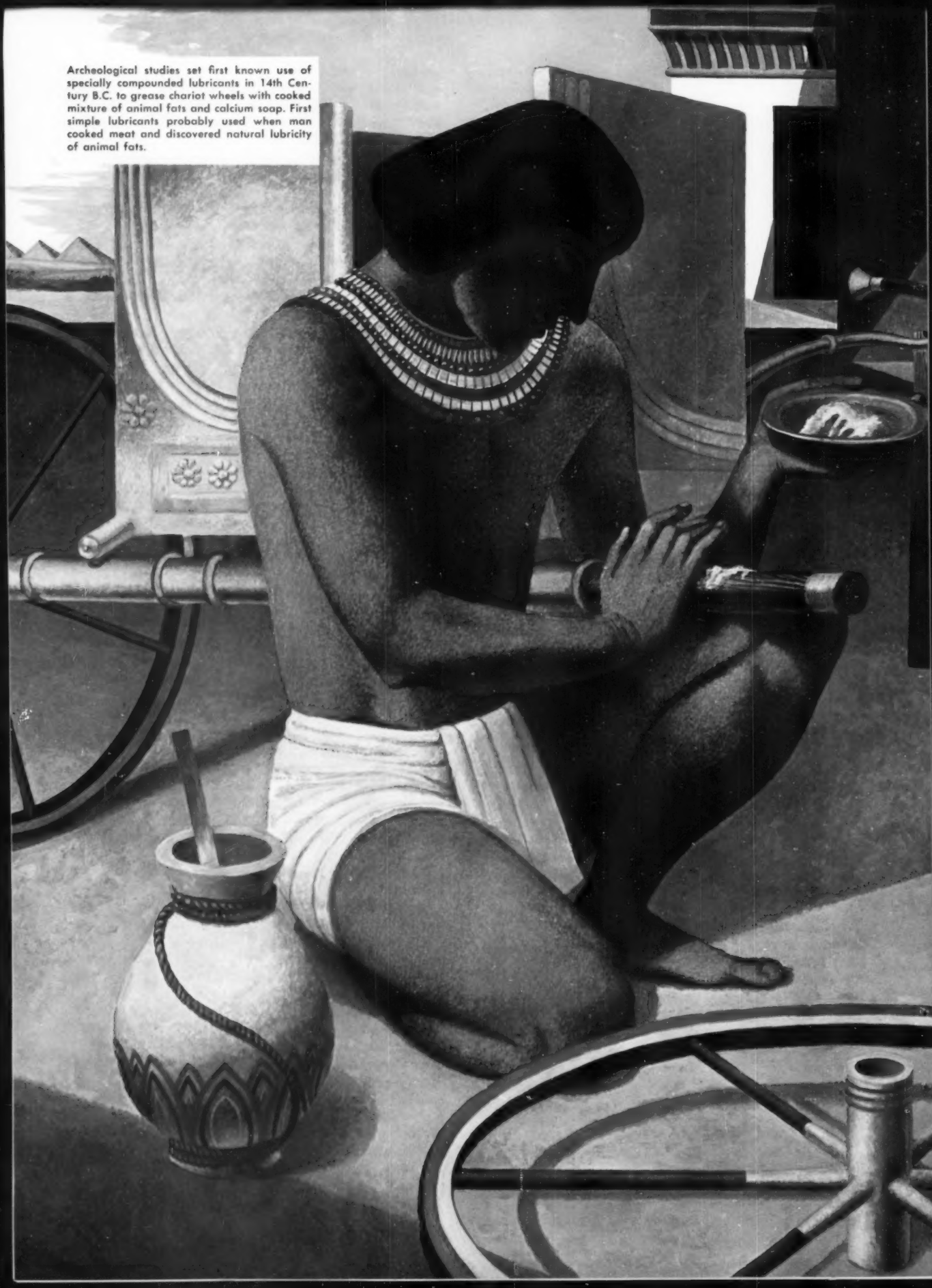
And so it went, on and on, through a long, dreary, unprofitable day. The California gas companies came off pretty well. Very little criticism was directed at them. The main victims were the gas producers, the overall gas industry, and FPC.

Gov. Brown seemed to be in his element, though somewhat distracted. At times when he leaned back in his chair and propped himself in semi-reclination with knees against the table, one might have gathered an impression that other matters were dancing through his head. Perhaps the conference was a little too close to the Democratic Convention to merit complete submersion in it.

On his left sat boyish-looking, ruddy-faced, wavy-haired William M. Bennett, chief counsel for the California PUC and chairman of the day. While fulfilling his role of fighting for the "trapped" gas consumers in his state, he reminded me of the typical "All American" prosecutor. In fact, I expected to see him reach under the table for a new supply of Wheaties at any time.

I was amazed to learn from inferences by the anti-gas industry and Anti-FPC group, and panel members, that gas pipeline companies and FPC work together hand and glove against the consuming public. Anything a pipeline company wants it gets from FPC, and it gets it fast. I hope the gas industry is aware of this. I also think our industry should know that it pretty well controls FPC and has done so since "FPC lost its regulatory vitality" after Eisenhower came into office with a "deliberate policy to go soft with business."

Now, frankly, I didn't know that we were so close to FPC and that the commission had treated gas companies coming before it as guests in the house. I have been laboring away for years under the impression that FPC was a pretty tough nut to crack with a rate increase or for a certificate to build a new pipeline. I didn't even know that FPC rushed to the aid of pipeline companies wanting to build new pipeline systems into areas not previously served with natural gas. I learned that it only takes a few weeks to get such a certificate. Prior to this conference I thought gas companies like the ex-Pacific Northwest, Houston-Coastal, Midwestern, Transwestern, etc., worked before FPC for years for their certificates. Now I know how easy it is to get one. This just goes to show how much one can learn by associating with intellectuals at one of these conferences.



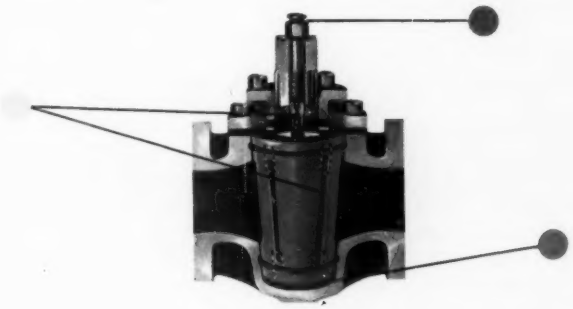
Archeological studies set first known use of specially compounded lubricants in 14th Century B.C. to grease chariot wheels with cooked mixture of animal fats and calcium soap. First simple lubricants probably used when man cooked meat and discovered natural lubricity of animal fats.

he greased the wheel of progress

. . . and his idea helped give you a better valve

One day about thirty centuries ago an ingenious charioteer silenced a squeaky chariot wheel with a handful of grease. To his surprise, the wheel not only ran quietly, but easier. Man had learned that lubrication makes things work better . . . and last longer.

Lubrication in Rockwell-Nordstrom lubricated plug valves does more than make them close easier and far outlast non-lubricated valves. *Pressurized* lubrication also hydraulically jacks the plug minutely from its seat, insuring easy operation and also maintaining a powerful seal against leakage around the plug . . . a seal that is instantly replaceable and can't be "worn out" like exposed metal-to-metal seats. For just a few of the reasons why you'll get better flow control at far lower cost with Rockwell-Nordstrom lubricated plug valves, examine the illustration below.



HOW LUBRICATION MAKES A BETTER VALVE

- Lubricant quickly, easily injected through Rockwell fitting.
- Lubricant travels through Sealdport® system to create powerful seals against leakage and prevent metal-to-metal wear between plug and body . . . note seats never exposed to the line.
- Lubricant hydraulically jacks plug minutely from seat for instant quarter-turn operation.

Rockwell-Nordstrom is the original and world's most complete line of lubricated plug valves. Available in sizes from ½" to 36" and pressures to 15,000 lb. For additional information, see your supplier or write: Rockwell Manufacturing Company, Pittsburgh 8, Pennsylvania. Canadian Valve Licensee: Peacock Brothers Limited. If you live outside the USA, write: Rockwell International S.A., Geneva, Switzerland.

Lubrication Makes The Difference

ROCKWELL-Nordstrom VALVES

another fine product by

ROCKWELL

Another thing I learned is how easy it would be to regulate gas producers on a fair and just basis if FPC really put its mind to it. There's nothing to it. There is no real problem to working out a formula and clearing the backlog of producer price cases rather quickly. Just go back to costs, much as you would in handling a rate increase application from Buzzards Bay (Mass.) Gas Co., and don't let anyone tell you that a gas producer can't be controlled equitably just as other public utilities are. Further, don't let anyone tell you that regulation of gas producer prices is a complicated matter and that it is nearly impossible to do a completely fair job of it.

The fact that FPC—or anybody to my knowledge—has been unable to establish needed general principles while testing such regulation itself for more than three years and after working at it ever since the Phillips decision, even with Mr. Connole aboard, was not mentioned. But perhaps Mr. Torkelson, from his perch up there in Wisconsin, where he must get a better bird's eye view than most on producers problems, and others, have a wealth of better perception and expeditious methods.

Somewhere in the conference I sensed the tack veered from doing something as a result of "a rising public clamor from gas consumers" to finding a way of generating some of this hard-to-find uproar. Several panel members made reference to the clamor that has fallen on their ears. However, the panel appeared to fish around from time to time in search to find ways and means of developing additional public reaction.

Mr. Vail was there for the AFL-CIO. Possibly there has been some clamor in his organization. And, I am sure, the rank-and-file will raise a clamor about nearly anything if properly cued to do so. But the AFL-CIO does not speak for the gas consuming "public." There is a lot of "public" around this country who simply do not belong to that group.

The nice Mrs. Nelson is from the Consumer Counsel of Gov. Brown's office. Maybe she, or Gov. Brown, or the PUC, or Mr. Carpenter's League of California Cities, has some facts and figures that would indicate a public clamor about gas prices. But they were not presented to the Governor's Conference on Natural Gas Problems. Further, I don't know which or what consumers are represented by Consumers Counsel. I am a gas consumer, am very happy with my gas rates and service, and sincerely hope Mrs. Nelson is not representing me.

I was shocked to see the way W. M. Jacobs was treated. After the unscheduled Mr. George Schlaff (see Jim Clark's "The Gassing Game") was given the floor in front of him, and after Mr. Peterson was moved from behind to in front of him on the schedule, Mr. Jacobs was finally called upon.

This was around 5 p.m. and Jacobs was cautioned by Chairman Bennett that the conference would close right at 5:30, and there was limited time available. This was a sorry situation, from my point of view.

I happen to know Mr. Jacobs. Though my acquaintance is slight, it is enough to convince me that he, along with Paul Kayser, knows more about the overall gas industry and its problems than all of the preceding participants, that made a presentation, put together. Further, I think he knows more about California gas consumers (simply because his company serves more customers than does PG&E), their prices, service to them, and their problems than nearly anyone else in California.

While I do not know Gov. Brown, Mr. Bennett, etc., at all well—and after this affair I hope our relationship stays that way—I feel safe in saying that nobody in southern California, at least, and probably in all California, is any more concerned about the welfare of gas consumers in this state than is Mort Jacobs. He is just that sort of man. People in general cannot grasp the fact that many gas utility people keep their customers in mind at all times and work long and hard to assure that their companies bring the best possible gas service to all customers at the lowest possible price. Mr. Jacobs is one of these men who never forget their companies' public service obligation.

So, this man with the ability to contribute as much if not more than any participant, and the only representative from the Pacific Lighting Corp. which serves some 8 million California people through 2.5 million gas meters, was extended what I charge as minimum courtesy and certainly short shrift. And while Mr. Jacobs was cutting his words to a minimum and trying to do a just job of presenting facts about the gas industry and his company and the customers it serves, Mr. Bennett at one point insisted on badgering him on a tax matter, knowing all the while that Mr. Jacobs is not PLC's expert on the subject.

Randolph Collier, a pleasant senator if there ever was one, supplied what was to me the laugh of the day. During the presentation of Fred Searls, the PG&E general attorney mentioned the proposed Pacific Gas Transmission Line as follows: "The project pipeline will carry more than 400 million cu ft of gas per day across mountain ranges, wide rivers, forests, deserts, and lava beds for a total distance of about 1400 miles." Sen. Collier immediately wanted to know why PG&E planned to spend money for running that 36-in. pipeline through lava beds. Don't they know that lava beds are hard to get through? Why didn't they run it along the highways where construction costs would be cheaper? And, couldn't they build this line a little further to the west?

Mr. Searls explained some basic facts of pipeline life to the senator and the exchange was terminated with the affable Sen. Collier hoping that PG&E would run the pipeline a little further to the west. I judge that a happy little jog to the west would put the pipeline in the good senator's Del Norte and/or Siskiyou counties.

Now all of this was, mind you, a meeting to discuss the critical problem of natural gas as it relates to gas consumers in California, according to the announced intent. But I don't think it was called for that purpose at all.

It was pretty obvious that it was called for purely political reasons, perhaps to do a little plank building, by a governor with aspirations leading to the White House.

Why is this conference of importance to the entire gas industry rather than just to gas companies in California and the pipeline companies that supply them? Because, first, since California imports of out-of-state natural gas constitute over 10 per cent of the

Continued on page 150

Springfield, a city of 104,000, is in the southwestern part of Missouri. City Utilities of Springfield owns and operates the gas, electric, water, and transportation systems. Of the 639 employees, 119 are with the gas department.

Of the 30,500 customers, 28,500 use gas for heating. About 18,600 meters are out of doors, or outside the customer's building.

Cities Service Gas Co., Oklahoma City, supplies City Utilities' entire gas needs through a single transmission line running from near Joplin. Springfield is at the extreme eastern end of the line. Therefore, any shut-out on this 67-mile section results in interruption of gas supply, unless City Utilities can maintain service from pack in the line.

Pressure normally carried by Cities Service is up to 400 psig. Pressure is reduced in two stages and leaves the city gate at about 128 psig. These pressures are continuously transmitted over telephone circuits to City Utilities gas operations building, general office, and back to the supplier's compressor stations.

The report that follows was made by E. L. Keene, manager; H. W. Steenbergen, senior engineer; J. W. Grant, utilization engineer; J. C. Andrews, construction engineer; and Robert Tate, engineer—all of City Utilities gas division.

City Utilities of Springfield calls on its

'Emergency Plan'

during total gas outage at 6 degrees

EXPERIENCE gained from two previous gas outages, in 1945 and 1950, led to improvement of an existing Emergency Program for use during any subsequent emergency.

This program provided a definite preplanned course of action in the event of complete or partial loss of gas pressure in the system. The program also kept key company personnel informed of their duties in establishing and maintaining an emergency organization for restoring gas service (see *Fig. 1*).

Complete turn-off, with repressuring and turn-on by pressure districts, was the planned procedure for restoring service. Turn-off was to be made using meter reading books with the meters being tagged. Tag No. 1 (*Fig. 2*) would be attached to a meter when it was turned off. Stubs from these tags would be returned to the operations base for sorting into pressure districts before beginning the turn-on. Tag No. 2 (*Fig. 3*) would be placed on all entrances of buildings where meters were inside and entrance could not be gained.

When a meter was found still inaccessible during turn-on, Tag No. 3 (*Fig. 4*) would be used on all entrances with the stub returned to the base of operations.

A sample of each tag, emergency car sticker, meal ticket, and identification card was included in bound copies of the Emergency Program.

Basic general information and instructions were given in the bound copies of the Emergency Program. This included valve locations; possible purge points in pressure districts; lists of industrial customers' equipment which could cause partial vacuum on gas mains; priority customer lists, giving hospitals, rest homes, etc.; and lists of customers with standby fuel. Also included were lists of company employees, local plumbers and gas fitters and other gas companies that might have available help.

The location and listing of emergency equipment and supplies, such as tags, wrenches, and flashlights also were included in the bound volume.

By E. L. KEENE, Manager Gas Department
City Utilities of Springfield, Springfield, Mo.

GAS exclusive

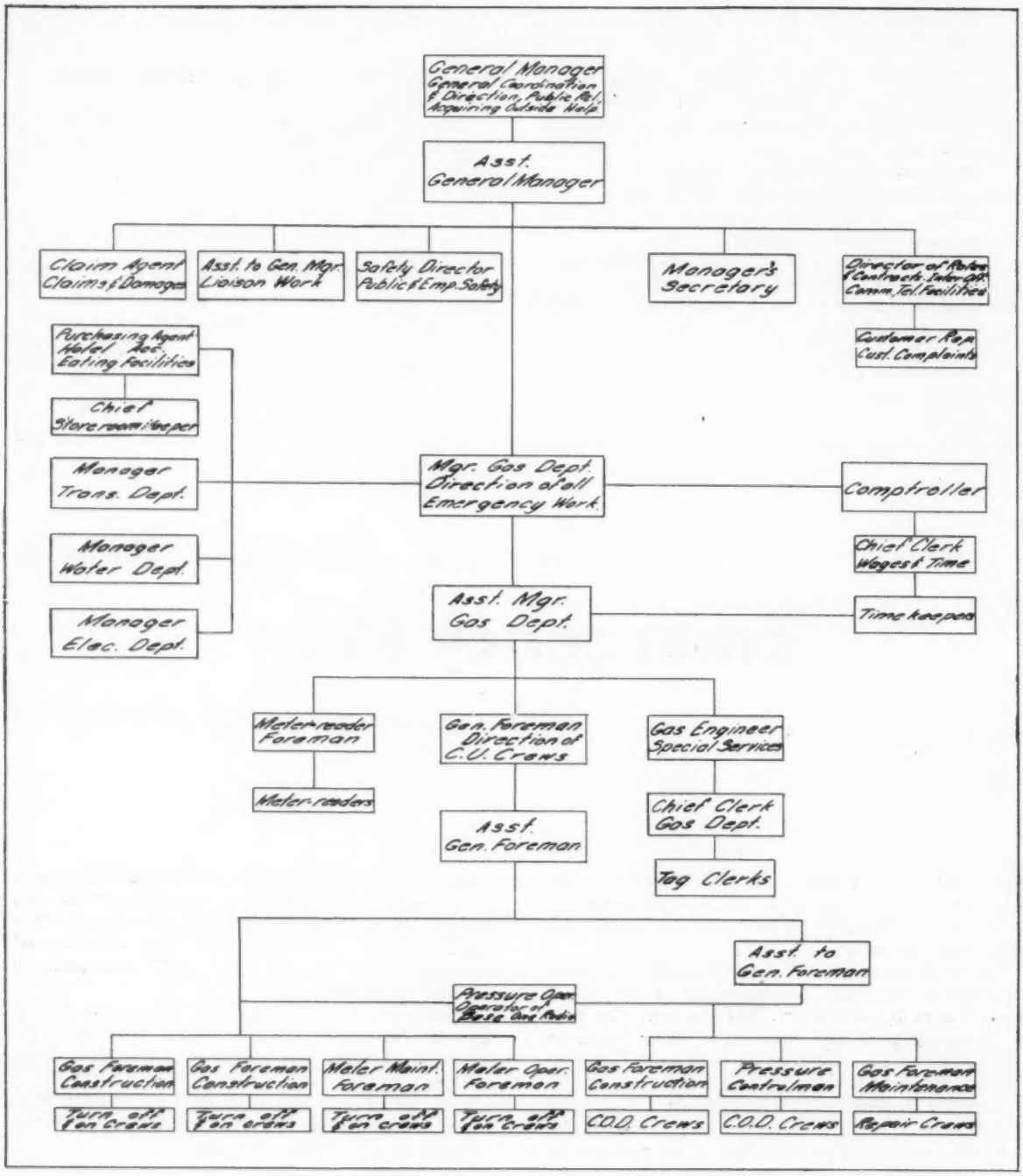


FIGURE 1.

At approximately 1:30 P.M., Jan. 21, 1960, the Cities Service Gas Co. supply line to Springfield was ripped open by the shoe of a cable-laying machine which was installing a cable for the Southwestern Bell Telephone Co. The temperature was 29 deg F at the time this accident occurred and the line was carrying approximately 225 psig pressure. Escaping gas caught fire, necessitating a shut-down of the line to make repairs. The repairs were made by Cities Service personnel and City Utilities' employees, with the help of the contractor's employees and equipment. The location of the break was 14 pipeline miles from the city gate of Springfield.

We literally ceased all other utility operations except electric power production and bus transportation operations. Pressed into service were 175 employees

from our water, electric, transportation, office, and engineering sections. All field activity was centralized at our gas operations building and all turn-off and turn-on crews reported to this point.

In order to coordinate the entire system, each department was assigned duties (as previously outlined in our Emergency Program). As planned, our general manager called other nearby gas utilities and asked for assistance.

In addition, through the purchasing agent, all local plumbing and heating supply and service organizations were notified and asked for assistance. The general manager's department handled all news releases and set up an emergency telephone center in the general office building to handle customer calls.

The purchasing agent made arrangements for lodging for out-of-town personnel and contacted local restaurants to provide meals for all emergency crews.

The department manager was directly in charge, through his foremen, of all actual physical work and kept the general manager informed of the total progress so that information could be relayed to the public. He also informed our supplier, Cities Service Gas Co., as to progress of repair and restoration of service in order to get a gradual buildup of necessary pressures.

The accounting department, under the direction of the comptroller, became responsible for time cards, transportation records and issuance of meal tickets. The meter reading department foreman issued all meter books and turn-off tags in a sequence approximating our cutoff or pressure district zones.

The engineering section organized the workers into two- or three-man crews, routed them through the building, and gave them instructions covering turn-off work and the handling of tags. The chief storekeeper handled the issuance of tools required by the workers. These had been previously stored at the gas operations building especially for this purpose.

The filing and sorting of all emergency turn-off tags were handled by our chief clerk, with assistance from the engineering section concerning limits of cutoff districts or zones. This was a full-time job for about 10 clerks, since our meter book areas do not coincide with our cutoff districts.

The general foreman and assistants were in charge of isolating all cutoff districts and purging and repressuring our lines.

At 2:45 P.M., Jan. 21, when it was fully determined pressure to the city was lost, our pressure control man closed the mainline valves at the city gate and began isolating each cutoff district at its supplying district regulator, or regulators. The city was now completely without gas.

In the meantime, workers were assembling at our operations center and were being processed and instructed as rapidly as possible. Our telephone switchboard was flooded with calls for the next several hours despite 18 direct lines being manned at all times.

Turn-off proceeded as outlined in our Emergency Plan. Turn-off tags were issued, 100 to the bundle to match the meter books. All necessary warning tags to be used when meters could not be shut off, were issued along with the turn-off tags.

The services attached directly to the high pressure loop line (50 psig), and adjacent high pressure areas, were issued first to the cutoff crews in order that this loop could be repressured as soon as gas was available at the city gate.

Repairs to mainline were completed and gas restored at the city gate by 6 P.M. the same day. By this time, all cutoff districts had been isolated. As soon as customers attached to our high pressure loop system were turned off, the main city gate valves were opened and these lines purged of air. Light-up crews then started relighting appliances of customers on these high pressure lines. News releases kept the public informed as to how to protect their water systems and warned them against attempting to relight their own appliances. Later this warning was modified to state that relighting should be done only by experienced personnel.

Hospitals, commercial and industrial customers, and our power plants were given permission to use gas. Meanwhile cut-off crews were still turning off meters and tagging them in other cut-off districts.

When all customers in a district had been turned off, gas was then released into that district and the lines purged of air. The light-up crews could then start lighting appliances in that district using the stubs which had been torn from the turn-off tags. Throughout most of Jan. 22, some crews were lighting appliances while others were still turning off meters in other districts. It was close to 4 p.m., Saturday, Jan. 23, before the last tag stubs were released for light-up procedure. Customers were requested to call City Utilities after 8 p.m., on Saturday, if they did not have gas heat. The response indicated that relighting was complete.

We concluded it advisable to have an outside worker per 70 to 90 meters for winter-time emergency.

Our own gas department crews then were able to do the mop-up work of checking houses to which entrance had not been gained earlier. Isolated cases, which were missed, or people who were away from home, were also worked by our crews. Every effort was made to enter all houses that had inside meter locations to be certain that no damage would result from escaping gas. Considerable assistance, where hazardous conditions were found, was given by the fire and police departments working with our own City Utilities' crews.

Throughout the outage, regular gas department employees, experienced in appliance work, were used in special work. Their work included quickly turning off some special industrial and commercial gas equipment. They also were used in turning on, when gas was back in the district, all hospitals, rest homes, and large customers. Also, those roving crews, equipped with mobile radios, were available for quick response to urgent trouble calls. Sickness cases were given priority in relighting.

In general, we are well satisfied with the way our Emergency Plan functioned and with the speed that service was restored. However, certain improvements are being discussed. They are:

• 1. The use of an IBM card system of turn-offs, turn-on, which would coincide with our cut-off dis-

tricts, rather than with the meter books.

• 2. We also feel that identification badges pinned on the outside of clothing would be better than the emergency card used during the past outage.

• 3. We are considering the use of catering service for feeding our employees rather than using local restaurants. Locations of the catering points would be in various sections of the town with not more than 200 meals being served at any one time. Parking for this purpose is a problem.

• 4. Prepared news releases would inform our customers of the progress of workers in order that door-to-door profiteering by unauthorized personnel charging for relighting could be avoided.

• 5. Caution our workers not to skip around and relight their friends' heating equipment ahead of their proper sequence. This didn't do anything for our public relations.

• 6. We are considering the use of television and other news media to tell our customers how they may turn off their own gas meters and protect their water systems if outage occurs during extremely cold weather. This might be done by a prepared film strip which would be released to television stations immediately upon notification of an outage.

• 7. Our personnel department would be used more effectively in screening local workers other than City Utilities' personnel, to determine their capabilities and to agree on wage rates. Wage agreements with local plumbing, gas fitting, and sheet metal establishments may be worked out in advance to establish a fair and just wage.

• 8. In order to coordinate work of other city departments such as the police, fire, and public works, with that of City Utilities, several more unlisted telephones will be installed in the near future.

Much discomfort resulted from the low temperature experienced. At no time during the 52-hour period did the temperature rise above the 29-deg F mark, and the two morning lows were 6 and 8 deg. The cooperation of all the people involved is a "must" if 30,500 meters are to be turned off, lines purged of air, and then relighted in a matter of 52 hours without any serious accidents or results. We had that type of cooperation from everyone, including news media. ■

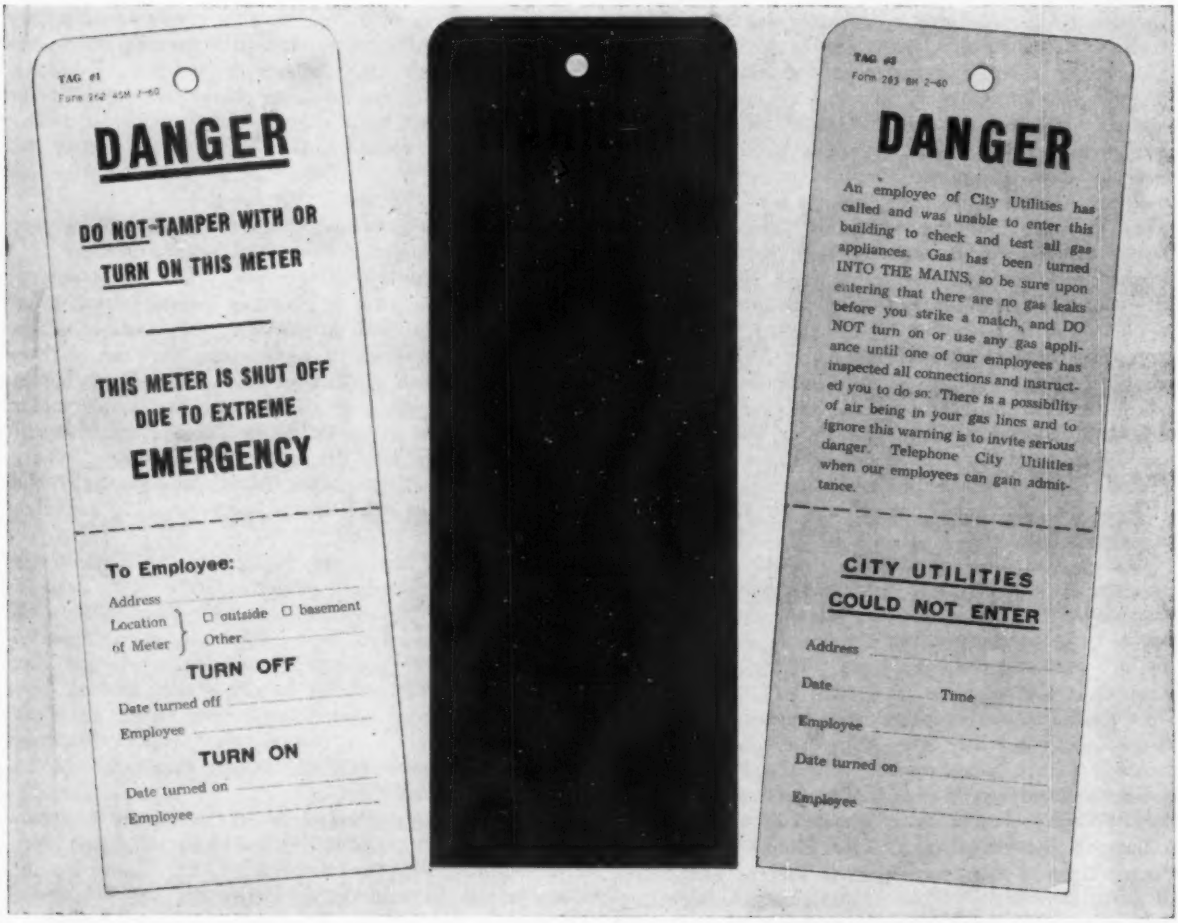

TAG #1
DANGER
DO NOT TAMPER WITH OR TURN ON THIS METER
THIS METER IS SHUT OFF DUE TO EXTREME EMERGENCY
To Employee:
Address
Location of Meter
☐ outside ☐ basement
Other
TURN OFF
Date turned off
Employee
TURN ON
Date turned on
Employee
TAG #3
Form 263 BH 2-60
DANGER
An employee of City Utilities has called and was unable to enter this building to check and test all gas appliances. Gas has been turned INTO THE MAINS, so be sure upon entering that there are no gas leaks before you strike a match, and DO NOT turn on or use any gas appliance until one of our employees has inspected all connections and instructed you to do so. There is a possibility of air being in your gas lines and to ignore this warning is to invite serious danger. Telephone City Utilities when our employees can gain admittance.
CITY UTILITIES COULD NOT ENTER
Address
Date
Time
Employee
Date turned on
Employee

Fig. 2. Tag No. 1

Fig. 3. Tag No. 2.

Fig. 4. Tag No. 3.

Robertshaw's initial pipeline equipment entry

A UTILIZATION equipment component supplier for years, the Robertshaw-Fulton Controls Co., has nominated its initial entry in the automated pipeline equipment sweepstakes. It's a completely pneumatic, "inherently explosion-proof" control system for automatically starting, loading and shutting down internal combustion engines.

Two of the company's eight manufacturing divisions have long been keenly interested in the gas industry—as suppliers of appliance controls. Having thus accumulated a considerable knowledge of industry, the company, naturally wanted to extend its interest to include the production and transmission phases. Investigation revealed that one of the chief concerns of transmission people is adequate control and protection for compressing equipment, which includes big internal combustion engines. While its Fulton Sylphon division had no experience with the gas industry, it had—for a great many years—manufactured self-operated safety controls for internal combustion engines and was serving the petroleum and petrochemical industries.

Product development laboratory space at the division's headquarters in Knoxville, Tenn., was available. So, that facility was assigned the job of developing a complete safety system for the large, elaborate engine set-ups found in gathering and transmission installations.

To find a fresh approach, engineers from Fulton Sylphon contacted gas pipeline operators and engine builders. It soon became apparent that an adequately coordinated automatic start/stop system was just as important as the safety shutdown. Armed with all available information on system requirements, design and development work was undertaken. The newly announced system is the result.

Straightforward pneumatic circuitry with simplified, standardized components provides maximum system flexibility, enabling each engine installation to maintain the exact degree of control and protection desired. Constantly monitoring any number of measurable variables, the system responds instantly to any malfunction or abnormal condition. The installation's individual requirements dictate the number and kind of monitored variables, which may include: temperature, pressure, vibration, flow rate, level, engine over-speed, etc.

One specific advantage to the system is that all of its components are designed, manufactured, and assembled by Robertshaw. This provides one-source responsibility backed by 50 years of experience in engine control equipment. Thus, the engineer in the field is relieved of the responsibility of gathering separate components from various manufacturers, designing and building his own system, and then being plagued by troubles stemming from the incompatibility of components. ■

Here is a new method of accurately determining the lowest cost of gas requirements regardless of the number of differently priced gases within the sendout.

Is the cost of your gas requirement at a minimum?

By CHARLES M. TENNEY JR., Consulting Management Engineer

SINCE the cost of gas is the major expense of a company, a detailed look at the most economical volumes of purchase gases is always welcomed. Much has been written about various methods available to the gas engineer. But all of these tend to require either a long series of trial-and-error calculations or, in desperation, an educated guess.

Here, then, is a completely accurate mathematical solution of *all* economic gas balance problems regardless of their complexities. The method used is first-year calculus, which basically goes through the motions of trying all possible combinations but requires only a few simple calculations to determine the minimum cost of sendout gas.

I intend to describe the fundamental principles as specifically as I can in the space available. I am willing to risk another look at this much-discussed subject because I believe that too often it has been treated in such general terms as to be of little help.

Basic data required

- **Temperature duration curve**

Since it is considered that heating sales are directly proportional to degree days, a daily mean temperature duration curve similar to *Fig. 1* is required. This

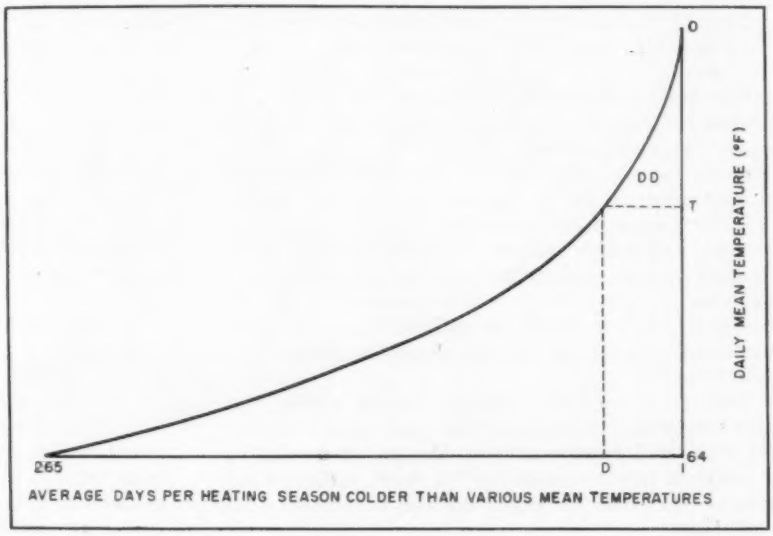


Fig. 1. Mean temperature duration curve.

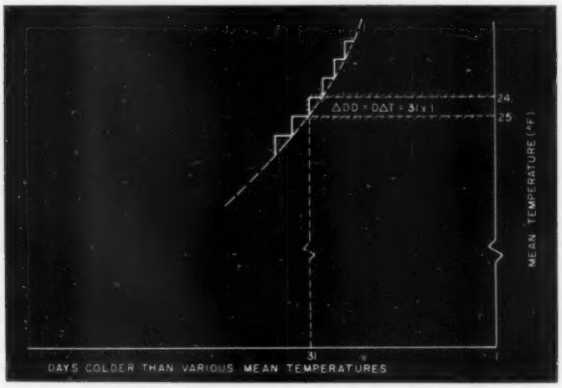


Fig. 2. Temperature duration curve.

curve is developed by taking a long period, say 10 to 15 years, and determining the average number of days per year that each mean temperature occurred.

If these average days are plotted for each mean temperature in ascending numerical value of temperature, a duration curve will result. Actually, the shape will be saw-toothed, but a smooth line as in *Fig. 1* can be used without any loss of accuracy. This, then, shows the mean temperature, T, plotted against the number of days, D, colder than the mean temperature. The number of degree days, DD, colder than a particular mean temperature is represented by the area under the curve and above the mean temperature, T.

Fig. 1 actually represents a New England city where there are about 6000 annual degree days. In other words, the total area under the curve is 6000, the peak is a 0 deg F mean temperature, and there are about 265 days of heating during a season. A specific point on this curve shows that when the mean temperature equals 25 deg F, there are 232 degree days per heating season colder than this temperature. And, they will occur on 31 days.

• Analysis of the temperature duration curve

An interesting aspect of this temperature duration curve is shown on *Fig. 2*, this is an enlargement of *Fig. 1*. The point mentioned above (T = 25 deg F and D = 31 days) is shown. Also, a mean temperature of 1 deg F colder, 24 deg F, is located. Since there are 201 degree days colder than 24 deg F, the temperature segment of 1 deg F, 25 deg F less 24 deg F, contains 31 degree days, 232 less 201. In other words, the area between 24 deg F and 25 deg F, called ΔDD, is equal to the change in temperature, ΔT, times the number of days when the temperature is colder than 25 deg F. Mathematically, this fact can be written as:

$$\Delta DD = D\Delta T \text{ or } \frac{\Delta DD}{\Delta T} = D$$

This also means that the incremental change in degree days divided by the incremental change in temperature equals the days colder than the temperature at which the increment is taken. Remembering our calculus, we can also state that the rate of change of degree days with respect to temperature equals days. This would be represented by:

$$\frac{dDD}{dT} = D$$

• Sendout duration curve

To relate this mean temperature curve to the sendout of a gas company, we must construct a sendout duration curve for a recent heating season. This curve, if compared to the actual weather during the period, will develop the firm non-temperature affected or base load (Mcf per day), the heating load (Mcf per degree day), and the seasonal or interruptible sales (Mcf per day). Companies with a large space heating saturation or a small central heating saturation can obtain more accurate results by using 12 monthly sendout duration curves. An example of a

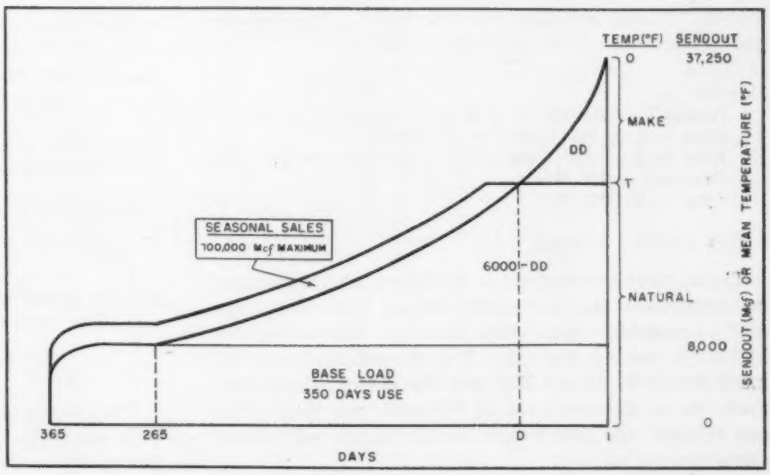


Fig. 3. Sendout duration curve for first example.

sendout duration curve is shown on *Fig. 3.*

This is a representation of a distributor's heating season sendout showing seasonal sales, base and heating load. The lower area represents the total base load. It is determined by multiplying its peak by the load factor, 350 days' use. The heating load is shown as being directly proportional to the temperature duration curve. And, the total seasonal sales are shown as occurring when the firm sendout is less than the natural gas demand which occurs at some temperature, T. The volume of make gas is shown as DD, and the natural gas used for firm heating sendout is represented by the total degree days less the make gas degree days (6000 — DD).

Calculation for the minimum cost of gas

• Various gas volumes equated

Before a cost equation can be developed, the various gas volumes must be written algebraically. From monthly sendout duration curves it was determined that the heating load for the season equaled 420 Mcf per degree day and the heating load on colder days was 450 Mcf per degree day. The maximum annual amount of seasonal sales was 700 MMcf. The various gas volumes are then equated as follows:

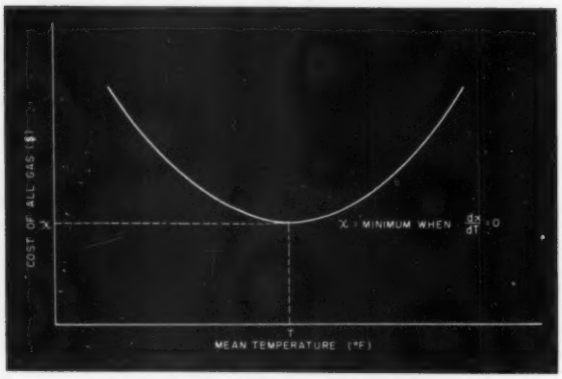


Fig. 4. Cost curve for first example.

Natural gas
Demand = 450(65-T) + 8,000 = 37,250-450T Mcf
Base load = 350(8,000) = 2.8 MMcf
Heat load = 420(6,000-DD) = 2,520,000-420DD Mcf
Seasonal = 700 MMcf
Make gas = 450DD Mcf

• Gas volume pricing

The natural gas demand is $6.30 per Mcf of demand per month and the commodity charge is 34 cents per Mcf. Commodity purchases are only allowed up to 270 days use of demand. The incremental cost of make gas is $1.75 per Mcf and the seasonal sales are made at an average rate of 54 cents per Mcf. The gas volumes are then priced in accordance with their respective rates.

Natural gas
Demand = 12(6.30) (37,250 — 450T) = $2,816,100 — 34,020T
Base load = .34(2,800,000) = $952,000
Heat load = .34(2,520,000 — 420DD) = $856,800 — 142.8DD

Cost of seasonal = .34(700,000) = $238,000
Sale of seasonal = .54(700,000) = $378,000
Make gas = 1.75(450DD) = $787.5DD

• Cost formula

The basic theory of peak shaving demands that the cost of all sendout gas be set at a minimum. Since the firm heating customers generate valley gas for seasonal sales, the total gas cost for demand calculating purposes should be reduced by the gross profit on all seasonal business. Taking this fact into consideration, the following equation for the cost of all gas can be made:

The cost of all gas, x, equals the demand cost plus the commodity cost of the base load, the heat load and the seasonal gas less the gross income on seasonal sales plus the cost of make gas

or $x = 2{,}816{,}100 - 34{,}020T + 952{,}000 + 856{,}800 - 142.8DD + 238{,}000 - 378{,}000 + 787.5DD$

collecting terms:

$$x = 4{,}484{,}900 - 34{,}020T + 644.7DD$$

or $x = A - BT + CDD$, where $A = 4{,}484{,}900$, $B = 34{,}020$, $C = 644.7$

• Solution

This cost equation is represented by the curve on *Fig. 4,* which shows the minimum cost will occur at the bottom of the curve or when its slope is zero. Since the slope of this curve is equal to the rate of change of cost with respect to temperature, $\frac{dx}{dT}$, the minimum cost of gas can be determined by setting the first derivative of cost with respect to temperature equal to zero.

$$\text{or} \quad \frac{dx}{dT} = 0 = -B + C\frac{dDD}{dT}, \text{ but } \frac{dDD}{dT} = D$$

$$\text{therefore} \quad 0 = -B + CD$$

$$\text{or} \quad D = \frac{B}{C} = \frac{34{,}020}{644.7} = 52.8 \text{ days}$$

The mean temperature at which there are 52.8 days colder is 30 deg F. Therefore, the most economical natural gas demand would be:

$$450(65 - 30) + 8{,}000 \text{ or } 23{,}750 \text{ Mcf}$$

Since there are 465 degree days colder than 30 deg F, 450 times 465 or 209, 250 Mcf would have to be made.

The amount of purchase natural gas would be:

$$2{,}800{,}000 + 2{,}520{,}000 - 420(465) + 700{,}000$$
$$\text{or} \quad 5{,}824{,}700 \text{ Mcf}$$

and the purchase gas load factor would be 245.3 days use. The total cost of all gas would then be:

$$4{,}484{,}900 - 34{,}020(30) + 644.7(465)$$
$$\text{or} \quad \$3{,}764{,}086$$

This example is relatively simple since it contains only one type of gas other than firm natural. To demonstrate the versatility of solving economic gas

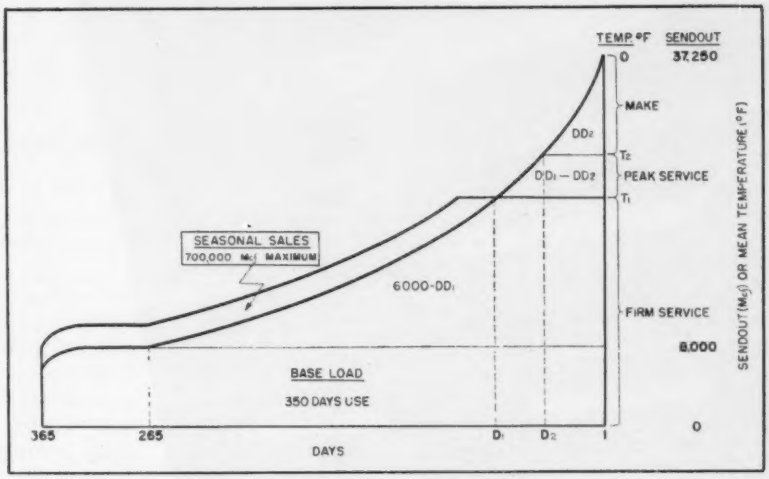


Fig. 5. Sendout duration curve for second example.

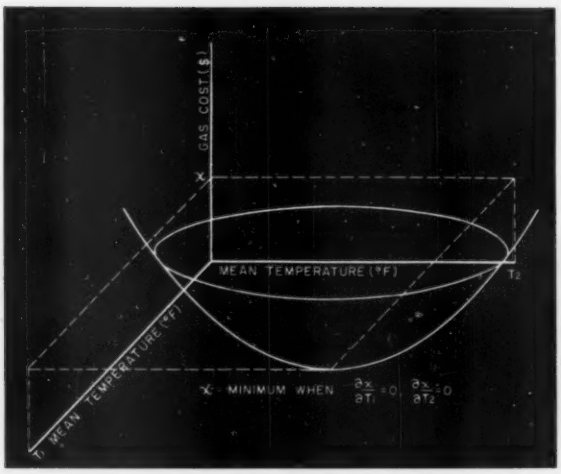


Fig. 6. Cost curve for second example.

balances with this calculus approach, a second example will prove helpful.

• Second example

Assume this distributor could purchase pipeline peaking service which is priced on a flat rate of 96 cents per Mcf. However, the service is under a take-or-pay contract requiring 60 days purchase of demand. The sendout duration curve for the heating season is shown on *Fig. 5* where all the prices and volumes are the same as the previous example (*Fig. 3*), except for the natural peak service which occurs in the temperature segment between T_1 and T_2. The gas volumes are then determined.

Natural gas

Demand = $450(65 - T_1) + 8{,}000 = 37{,}250 - 450T_1$ Mcf

Base load = $350(8{,}000) = 2{,}800{,}000$ Mcf

Heat load = $420(6{,}000 - DD_1) = 2{,}520{,}000 - 420DB_1$ Mcf

Peak service = $60(450)\ (T_1 - T_2) = 27{,}000T_1 - 27{,}000T_2$ Mcf

Seasonal = Remaining portion of 270 days use of demand = $270(37{,}250 - 450T_1) - 2{,}800{,}000 - (2{,}520{,}000 - 420DD_1) = 4{,}737{,}500 - 121{,}500T_1 + 420DD_1$ Mcf

Make gas = $450DD_2$ Mcf

These volumes are then priced out in the same manner as the previous example.

Natural gas

Demand = $12(6.30)\ (37{,}250 - 450T_1) = \$2{,}816{,}100 - 34{,}020T_1$

Base load = $.34(2{,}800{,}000) = \$952{,}000$

Heat load = $.34(2{,}520{,}000 - 420DD_1) = \$856{,}800 - 142.8DD_1$

Cost of seasonal = $.34(4{,}737{,}500 - 121{,}500T_1 + 420DD_1) = \$1{,}610{,}750 - 41{,}310T_1 + 142.8DD_1$

Sale of seasonal = $.54(4{,}737{,}500 - 121{,}500T_1 + 420DD_1) = \$2{,}558{,}250 - 65{,}610T_1 + 226.8DD_1$

Peak service = $.96(27{,}000T_1 - 27{,}000T_2) = \$25{,}920T_1 - 25{,}920T_2$

Make gas = $1.75(450DD_2) = \$787.5DD_2$

The total cost of all gas, x, including a credit for seasonal sales would then be:

$$x = 2{,}816{,}100 - 34{,}020T_1 + 952{,}000 + 856{,}800 - 142.8DD_1 + 25{,}920T_1 - 25{,}920T_2 + 1{,}610{,}750 - 41{,}310T_1 + 142.8DD_1 - (2{,}558{,}250 - 65{,}610T_1 + 2.26.8DD_1) + 787.5DD_2$$

collecting terms:

$$x = 3{,}677{,}400 + 16{,}200T_1 - 25{,}920T_2 - 226.8DD_1 + 787.5DD_2$$

or $x = A + B_1T_1 - B_2T_2 - C_1DD_1 + C_2DD_2$,

where $A = 3{,}677{,}400$

$B_1 = 16{,}200$

$B_2 = 25{,}920$

$C_1 = 226.8$

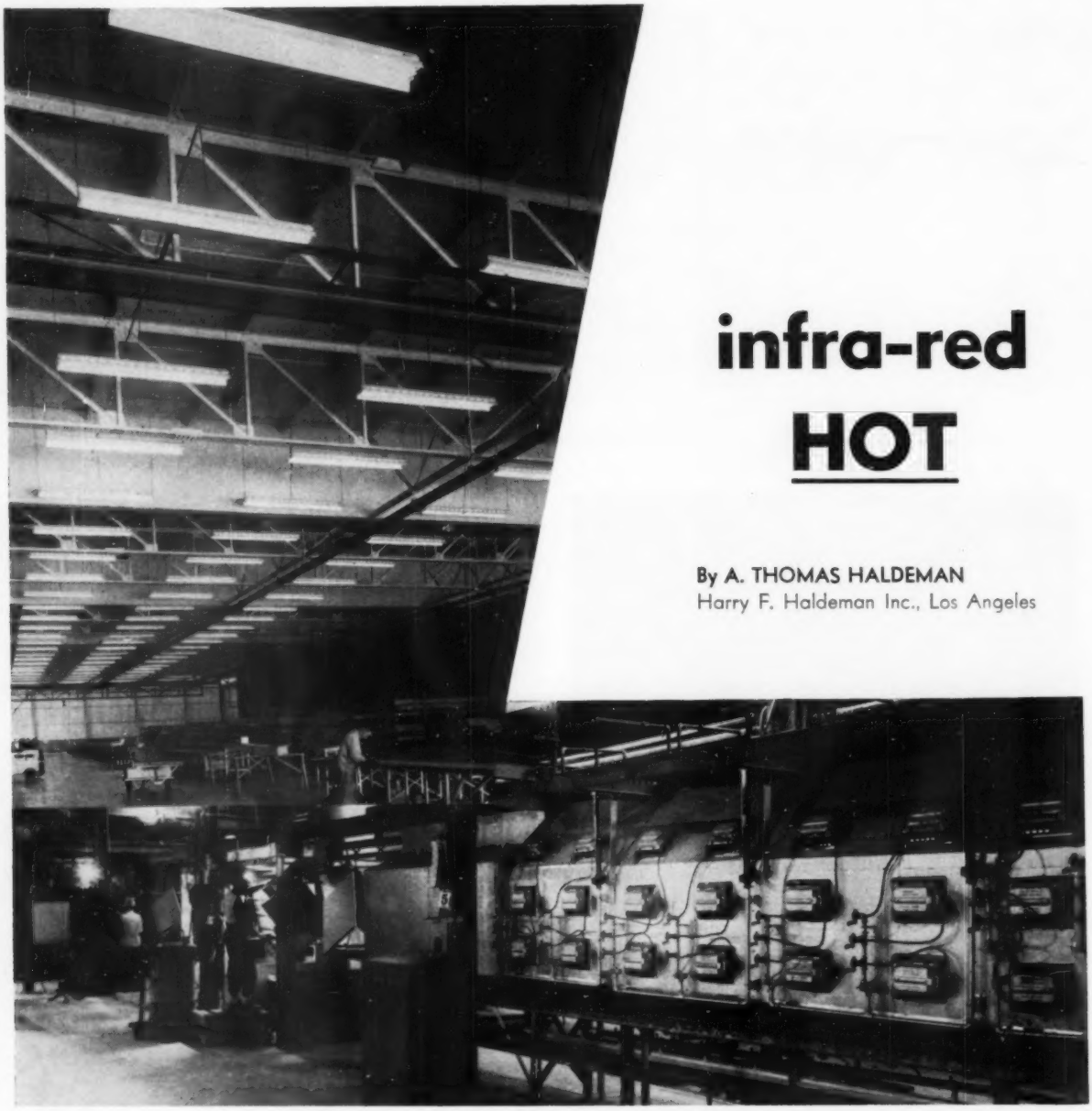
$C_2 = 787.5$

This cost equation is represented by the curve shaped like a mixing bowl on *Fig. 6* where the cost of gas is a minimum when the partial derivatives of the cost with respect to all the temperature variables equals zero. This minimum must also satisfy the take-or-pay provisions of the peaking service as equated below:

Continued on page 151

infra-red HOT

By A. THOMAS HALDEMAN
Harry F. Haldeman Inc., Los Angeles



From comfort heating (above) . . . to paint drying

ONE of the greatest things that has happened to the gas industry in the past 50 years is the development of a new convenient way to produce and use heat that is as old as the sun.

On Dec. 25, 1956, the U.S. Bureau of Patents issued U.S. Patent #2,775,294. As this is a strange day for any kind of business, the only thing I can figure is that it was a Christmas present to the gas industry. This patent gives Perfection division of Hupp Corp., Cleveland, Ohio, the right to manufacture and sell a ceramic that efficiently creates infra-red heat from gas.

Burners using these ceramics have been used extensively in Europe for the past 10 years and in this country for over five years. They successfully perform tasks that were heretofore considered impossible.

For many years scientists and engineers have known gas to be the most practical source of infra-red heat. Some years ago, a German scientist, Gunther Schwank, developed the convenient infra-red burner which bears his name. The heart of the burner is a $\frac{3}{8}$-in. thick ceramic mat perforated with 200 holes

to the square inch. This mat, when placed in a housing, is called a rayhead, it has a normal input of 12,000 Btu per hour. Gas, metered through an orifice, passes through an air aspirating chamber, through a mixing tube, then to the chamber under the ceramic mat. This is a 100 per cent primary air burner which operates at 3½-in. wc with neither premix nor blowers required. The gas and air mixture burns on the surface of the ceramic mat bringing it up to a temperature of approximately 1600 deg F. Rayheads are combined into multiples as required.

The units normally used for comfort heating are approved by American Gas Association, Factory Mutual, International Conference of Building Officials and listed by Underwriters Laboratories. They have also been approved by building departments throughout the world. These units are the answer to comfortable controlled heat in high bay buildings, foundries, warehouses and steel buildings. They do the job because they heat the floor first. There are no ducts, no blowers, no heat exchangers.

The question is often asked, "What is Infra-Red energy and why is it better?" We are all familiar with the fact that infra-red energy is radiated to the earth by the sun. The wave length of these rays is longer than those of visible light but shorter than radio waves. They do not affect the air through which they pass but are absorbed by most objects which they strike. This is proven by the atmosphere five miles up, which is cold. In exactly the same manner, gas infra-red heaters warm only the objects that absorb the rays, without expending energy on the air around these objects. As these objects are warmed, however, they give off heat to the surrounding air, thus raising the air temperature. These infra-red rays provide uniform comfort without creating drafts at air temperatures below the normal comfort range.

The effectiveness of these heaters is illustrated by the fact that they are also used to provide comfort out-of-doors. As an example of this, streets in Belgium have Schwank infra-red heaters mounted above the showroom windows along the sidewalks. These units provide comfort for shoppers in cool weather—increasing window shopping and sales.

The owner of a race track, who installed gas infra-red heaters above the grandstand, stated that these units paid for themselves in the first three weeks of operation because the crowds would stay through the ninth race; before they left early when it was cold. The Canterbury hotel in San Francisco has installed these heaters in its outdoor dining area. Formerly, the patio was used occasionally on summer afternoons but it could never be depended on as a source of income. Since the heaters have been installed, the patio is used until midnight almost every night and a buffet is served two nights a week; luncheons are served daily.

The Los Angeles Board of Education has found that they can do away with indoor cafeterias and still provide comfortable eating conditions for the children by recessing gas infra-red heaters into the roof deck of outdoor dining areas. Eleven schools, now either under construction or already completed, are incorporating these units.

These installations indicate the tremendous potential for additional off peak gas load to provide outdoor comfort that was never before possible.

Infra-red units also are very practical for heating industrial buildings. Because the rays are similar to those of the sun, it is possible to do a practical job of either heating a small area or the entire building.

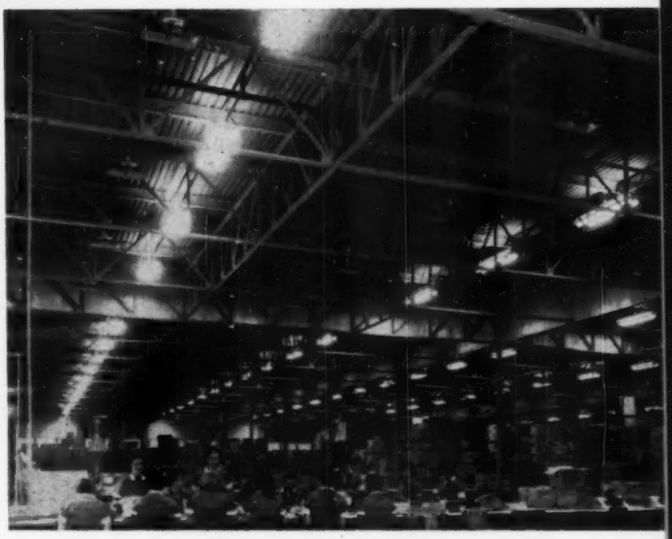
One of the most interesting installations in southern California is at TubeSales. The building is less than three years old and when it was built, unit heaters were installed throughout the building which is 300 ft x 427 ft with a 31-ft ceiling. After a few winter months, TubeSales' management called the gas company, complaining of a high gas bill and inadequate heating. The gas company surveyed the building and told TubeSales that it would be impossible to provide comfort with open doors and high ceilings using the unit heaters installed. Gas infra-red heaters were suggested. TubeSales purchased a trial installation of the Perfection Schwank units; these units provided comfort in the loading area where some of the doors were open 24 hours a day. This trial was so successful that the company installed 60 more heaters to provide comfort in the working areas of bays 1 and 2 and for condensation control in bay 3 where rust-susceptible welded tubing is stored. These heaters are 36,000 Btu each and are mounted 27 ft above the floor—high above the usable space and above the crane rail. TubeSales is adding two bays for which it has ordered an additional 71 heaters. This will increase their installed infra-red input to 5,040,000 Btu.

Max Factor's new building in Los Angeles has another interesting example of area heating. This building is 384 ft x 520 ft and has a 60 ft x 400 ft center area in which women work under infra-red heaters. Several other small areas also are heated by infra-red. The balance of the open area is unheated. The heated areas, however, all have warm floors, comfortable working conditions, warm materials and no drafts. This building was designed by Albert C. Martin & Associates, architects and engineers, who recommended the use of Perfection Schwank heaters. The customer's satisfaction has proven that these heaters are the answer to area heating problems.

At an aircraft plant in Los Angeles unit heaters mounted approximately 12 ft from the floor are used in one section of a building. Recently another section of the same size was added to the building and gas infra-red heaters were installed 30 ft above the floor. In the area where the unit heaters are located, they originally installed eleven 225,000-Btu unit heaters. Because some of these units interfered with a proposed crane, four of them were removed. The remaining unit heaters provide 140 Btu per sq ft input. In the newer section, fifteen 36,000-Btu infra-red heaters were installed. These heaters provide an input of 48 Btu per sq ft; approximately one-third of the input of the remaining unit heaters. The customer has commented that it is more comfortable and that they have better working conditions with less drafts in the area where the Schwank heaters are used than where the unit heaters are used. They are now considering removing the unit heaters and replacing them with gas infra-red heaters. This is typical of many installations we have encountered in hard-to-heat buildings.

Infra-red heaters warm racing fans at Batavia, N. Y.

Heating working area at Max Factor's in Hollywood, Calif.



Benjamin Franklin high school in Los Angeles has a typical gymnasium building that is about 30 years old. It was originally heated with steam radiators and like most gymnasiums was not comfortable. The Board of Education found that by installing Perfection Schwank heaters in the area they could provide comfort for gym classes even though doors were frequently open. With most heating equipment, it is necessary to maintain a constant temperature throughout the day to insure comfort for the hours the area is to be used. With the Schwank system, however, comfort is secured almost instantly by turning on the heaters. In a colder climate, some warm-up period might be required.

One of our first and most interesting installations in southern California was at Rohr Aircraft in Chula Vista. Rohr's original interest was in a process heating job. After seeing the burner, Rohr asked if it could be used for comfort heating as it had problems trying to provide comfort in various facilities. Rohr has over 1 million sq ft of plant area under cover. Just about every type of heating equipment had been tried, but the firm still had problems. At that time, a 200-ft x 240-ft building was being converted to manufacturing use. Rohr decided to use gas infra-red heaters. The building has since been enlarged to 800 ft x 240 ft and all four increments are heated with Perfection Schwank heaters. The heat loss of increments 1 and 2 is more than 5 million Btu. Forced air input, according to standard practice, is 6,280,000 Btu. The installed input of 3,072,000 Btu is less than half of the standard forced air input requirement. Rohr reports more comfortable conditions in this building than in other comparable buildings where the recommended forced air input is used.

Another terrific field for these heaters is condensation control or rust prevention. You have probably all noticed that a new saw or square left in the garage soon rusts; so do steel sheets and tubes in a warehouse. Steel manufacturers and jobbers have found that rust and corrosion on steel can be prevented by the use of gas-fired infra-red heaters. A major steel company in Seattle installed gas infra-red heaters around the perimeter and 40 ft above the floor in part of its steel storage area. The heaters are controlled by temperature and dewpoint controllers that automatically start the heaters any time the dewpoint falls below 10 deg above the temperature of the steel, thus maintaining the steel above the dewpoint. This installation and many others have been very successful in protecting steel from rust.

As these heaters have no moving parts, there is nothing to wear out. No one knows how long they will last because the first one made in Germany almost 14 years ago is still in use. The controls are all standard so can be readily serviced, if necessary. The units are easy to install. No ducts, no blowers, no heat exchangers. Just gas piping, control wiring and

hanging results in a wonderful, clean, healthy, controlled heat without drafts.

Now let me tell you about another use for this infra-red heat that will really give you year-round sales—drying, curing and other process uses. Wherever heat up to 1000 deg F is used in industry, Perfection Schwank gas infra-red burners will do the job better, faster and more economically. The infra-red rays produced by these heaters are waves of electro-magnetic energy similar to light, ultra violet, radio and TV waves. These waves travel through space in a straight line with the speed of light until they strike an object. Then the waves are either absorbed as heat or reflected. Infra-red energy is classified as: near or short wave (.8 to 1.5 microns), medium wave (1.5 to 4 microns) and far or long wave (4 to 300 microns).

A 4500-deg F source, such as an infra-red electric bulb, emits short wave infra-red with a peak at 1 micron. The Perfection Schwank heaters operating at 1600 deg F produce medium wave infra-red with a peak at 2.5 micron. A typical combustion chamber attains a temperature of 750 deg F, which produces long wave infra-red with a peak at 4.2 micron.

You cannot read a newspaper by the glow of a Schwank unit because most of its energy is in the form of heat. Medium infra-red is best suited for processing because common materials have much greater affinity to medium infra-red than near infra-red. Consequently, drying, curing and processing can be conducted faster and more uniformly at lower first cost, lower operating costs and a tremendous savings in floor space with medium wave infra-red.

To give you an idea of the varied fields in which these units are being used, such people as Hardwick, Norge, Magic Ray and Broaster are using the burners in their broilers; Hewitt Robbins is using the burners for thawing of coal cars. The John J. Fannon Co. of Detroit, a new subsidiary of Hupp Corp., is using the units for many process applications. Fannon's interest in gas infra-red stems from the years of successful experience it had in building quartz electric ovens. The lower operating cost of gas infra-red, rapid heating up and cooling characteristics and many other advantages have been exploited by Fannon for paint baking in conveyorized ovens and other complex processes. The advantages of gas infra-red are evidenced by the fact that Fannon has sold several gas infra-red paint drying ovens to replace electric infra-red ovens.

Use of infra-red heat for processing extends to nearly all branches of industry—ceramic, glass, food, plastic, chemical, metal, paper, textile, lumber construction, tool and die. The transportation and shipping industries use these units for drying, thawing, melting, etc. They are also used in raising livestock and agricultural products and in dehydrating these products. These units have many advantages over electric infra-red units, including greater flexibility and lower operating cost.

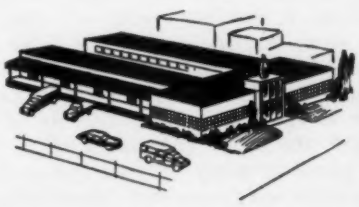
Some of the West Coast installations developed by Perfection Schwank distributors and dealers include a job at National Dye, where 96 burners, totalling 1,152,000 Btu, are mounted into an oven 10 ft high and 9 ft wide with opposing banks of burners 2 ft apart. This oven removes approximately 600 lb of moisture per hour from carpets after they have been dyed; the carpets go into this oven with 80 per cent moisture content and leave with 50 per cent. The carpet moves through the oven at a rate of 6.5 yd per minute. This oven has permitted the customer to increase his production 20 to 25 per cent. They feel they get a better finish on the nap of the carpet and better color quality by use of this predryer.

The controls for this oven include a safety interlock with the drive motor so that the burners lose their temperature almost instantly if the carpet stops. When the carpet starts moving again, the burners ignite instantly and come to their original temperature in a matter of seconds. This eliminates the possibility of temperature over-ride on the materials being processed. The carpet, after leaving this oven, goes into a convection loop oven which is 12 ft wide and 40 ft long. In this second oven, the moisture content is reduced from 50 per cent entering to 10-15 per cent leaving. Bear in mind, however, that the gas infra-red oven takes up only 18 sq ft of floor area against 480 sq ft for the convection oven. Also the input in the infra-red oven is approximately one-third as much as the convection oven. Needless to say, this customer is another happy Schwank user.

C & H Supply, manufacturer of anodized identification signs, has a typical process application where 15 rayheads are used over a conveyor which moves at 100 ft per minute. In the process, plastic powder is fused onto aluminum sheet. The burners can be adjusted up or down, depending on the thickness of the aluminum sheet being processed and the speed of the conveyor. These burners require neither premix nor blowers. Because of their small size and light weight, they allow tremendous flexibility. From our experience, we have come to the conclusion that we can process most products faster at less expense with gas infra-red than by any other method.

Many specific heat applications have been worked out by Perfection, Division of Hupp Corp., their distributors and customers who are continually turning to this gas infra-red burner for successful solutions to all sorts of processing requirements. Here is a new, convenient way to produce and use heat that is as old as the sun. This form of gas heating has successfully proven its superiority to other heating methods for comfort heating, poultry and livestock raising, agricultural applications, drying, processing and in practically every field of human endeavor. Infra-red heat is really a portable sunbeam waiting to help you build profitable loads wherever gas is available. Gas infra-red is *hot*. ■

This article is adapted from a talk presented at the PCGA spring sales conference, held March 23, 1960, in San Mateo, Calif.



Responsibility of outside contractors

By W. T. TAYMANS
Baltimore (Md.) Gas & Electric Co.

WE won't get around to taking anybody's responsibility for the accident that doesn't happen. Prevention has summit appeal for the claim man, granting that everything varies with one's own vantage point. Big complication is that, even in this awesome moonstruck age, no device for computing prevention values has ever reached the launching pad. The accountant rarely sets aside a ledger page for payout or claim reserve for pregnant loss potential that never reaches the accident room.

Even law and logic shuffle about in the effort to establish a negative. No statistic can be marshalled to show that househeating sales would have increased only 20 per cent instead of 35 per cent, save for the absence of hideous headlines for which type was never set. No one will ever know the dollar values of the single street leak which resulted from a 247th damage in the year when there were only 246. Nor in any manner correlate a 6-figure verdict which was not returned against the gas company with the $20,000 of contractor damage billed and maybe even collected.

In a very practical way, complacency is often the child of chance. It obscures reality as a coat of paint conceals a rusty downspout. Bearing witness is the operating man who successfully shores his trench with luck instead of timber in the face of conflicting excavations. Or, in areas where responsibility is not elsewhere lodged, the safety man swinging at the high hard pitch of public safety with one foot in the water bucket, the while being acclaimed "player of the year" in the field of employee safety. True, the keys to the master controls over accident prevention rest with management.[1]

By "outside contractors" we mean those working for city, roads or other public agencies, or for property owners other than the company.[2] Mostly we mean responsible contractors. Maybe the one that does most of our own work, and once in a while the agencies or owners themselves, or perhaps a friendly utility.

The outside contractor has an obligation of damage prevention in a pragmatic sense. He is bound to look around. He must heed information brought home to him by your prevention group.[3] He must take note of your ads in his trade journals and companion editorials highlighting danger elicited thereby, as well as your safety displays at his conventions. He is bound to use data made available from your plats and records. Also those of the municipal agency issuing his permit. He is bound to note the markings of your "M" scope operator and heed the instructions of your inspector who will be competent enough, say, to recognize the danger incident to too early removal of shoring from trenches compacted by flooding.

If there is a lamppost, or maybe a dwelling nearby, and no sky hooks are apparent, he has got to look around for underground pipe. With the use of just one-fifth of his senses, he can likely pinpoint the location. If he is in a city street, he doesn't need the courts to remind him that there are all manner of underground installations.[4] If it's a new street or development, he is bound, as we are, to look around for fresh and likely unstable installations. Detection devices aren't a dime a dozen. Manually operated picks are slow going. But in a given case they could be the biggest bargains he ever employed. The contractor has to look around from close up. He can't sit on the seat of his excavator and play Russian roulette with the last few inches of soil surrounding the gas pipe.

In your collection efforts you can sometimes get a lift out of provisions in the public agency contract under which the contractor is working.[5] Sometimes a public agency, or the property owner himself, because of XCU insurance exclusions or something such, is in the liability corral along with the contractor. This may introduce complications of policy which may be necessary evils. There is no point in complaining about their impact.

Collection procedures should be pursued with the same firmness the contractor displays in protecting his experience rating with his insurer, sometimes re-

[1] Cf. P.S. of Colorado—Don Miller's excellent "Safety Is Management's Business."

[2] In the hassle-full field of injury to employees of company contractors, for divergent views as to the part to be played by company safety men or "inspectors," compare Cincinnati's Walter Beckjord's 1956 presentation to the EEI Legal Committee, "Areas of Tort Liability in Utility Construction Projects" with views expressed at last year's Ebasco Safety Meeting.

[3] Cf. LILCO's John Bruckmann's "Extracts from Reports of Claim Agents Subcommittee Members on Activities of Their Companies in Prevention of Contractor's Damage to Gas Company Facilities" among other excellent programs, including our own in Baltimore under public relations auspices.

[4] *Public Service Ry. v. Mooney*, 99 N.J.L. 58, 125 Atl. 328.

[5] For an example, see *Portland Gas v. Giebisch*, 84 Ore. 632, 165 P. 1004, though the Court also shuffles in a disallowance of a portion of the patrol expense.

sulting in delays or omissions in making a report of the damage. Some insurance companies invite direct contact in such cases. Any way you make a few thumbprints on the wallet you might get a convert. Nothing is so well calculated to shut the window of damage indifference as the rustle of greenbacks blowing out of the office safe. Just such a vigorous approach over the years has converted the roadside pole for many utilities from a maligned obstruction to a source of substantial recoupment[6]—though far from fully compensatory.[7]

• Contractor defenses

"Cover" is a dirty word for a contractor's hiding place. Starting with alertness in checking the original enfranchising ordinance through a consistent operating position and aggressive collection posture, "cover" should not provide an escape hatch for the contractor where the nature of the terrain, evidences of regrading and such, elicit knowledge based on the contractor's own experience. For example: Houses on a high terrace can't be expected to have horizontal runs from the main unless the gas supply is brought in after the manner of drilling for oil. And, the presence of a fourth service pipe can hardly be surprising after three adjacent ones have been uncovered in the course of operations.

Sometimes in checking out the contractor's actions, you get a little whiff of cahoots in the attitude of the paving or other public agency inspector. In areas where this and similar political overtones prevail, there may be inducements to explore organization of subsurface structure committees.[8]

• Contractor litigation

There is much to be said for a firm policy of suit and trial employing effective tools of good reports, thorough investigation and competent counsel. That expense may exceed damage in a given case should not deter, certainly with a repeat offender or a recalcitrant insurer. At all odds, controlling policy should be sure footed and pointedly directed.

In some so-called common law jurisdictions, your legal problems may be simplified by actions in the nature of trespass. This has the effect of shifting some of the ordinary burdens of trial.[9] Your counsel will know about that. It's a tool that isn't necessarily related to the equities, and perhaps to be sparingly employed. Where there is a solid basis for computation you may have a shot at recovery for wasted gas. Questions may arise of cooperating in recoupment by your customer of his outage losses.[10] But how far you want to encourage activity in that field is something else. We might add that down our way the courts characterize the danger of bringing a crane into proximity with overhead electric wires as a matter of common knowledge despite testimony of fantastic broad-jumping arcs.[11]

• Contractor as co-defendant

Some public accidents resulting in suits against the gas company trace back to backfilling of a minor damage and provide a very strong appeal for dollar concessions to eliminate these hideaways. Effective procedures and techniques employed in the recoupment of your damages, with the same resourcefulness and drive exhibited by plaintiffs and their counsel busy about redistributing the wealth. may enable the gas company to make room on the defendant's side of the counsel table for the contractor. They might even permit you to abdicate in his favor. Once again you need competent counsel to explore prospects of a boomerang, as well as probe other possibilities of recovery.[12] Public claims are, of course, expensive everywhere. In Boston for instance, verdicts run about 20 per cent above the going rate for a given injury.[13] Bear in mind too that the law "is the only profession which records its mistakes carefully, exactly as they occurred, and yet does not identify them as mistakes. . . ."[14] Pity the unhappy storeowner in the footnote who had a simultaneous shot at a railway, an electric company, two telephone companies and a gas company. He wound up paying the costs.[15]

• Conclusion

We complete the circle by praising the efforts made in a field which sends up nearly agonizing cries for attention. They are characterized in informed insurance circles as "the most active cause of loss,"[16] referred to by the then Chairman of the New York Commission as a "most inexcusable hazard"[17] and comprising a major part of the depressing tally based on an 8-year study of explosions involving piping only, which blazed a trail through ashes and ruins wide enough to accommodate 102 hearses.[18] ■

---

[6] "Claims of Electrical Utilities Against Others," R. S. Metzger, Toledo Edison.

[7] David W. Smith, People's Natural Gas, "Indemnification by Legal Process."

[8] We understand that since 1911 in Chicago all work must clear through such a bureau, secretarial services being supported by the utilities. It is not known whether jurisdiction extended to the village of Roselle, 20 miles westward, where the onus of a terrible explosion in 1957 fell upon the gas company whose stub main was broken and the electric utility whose pole-hole mechanical augur broke it.

[9] *Ill. Bell Tel. Co. v. Chas. Ind. Co.* (1954) 3 Ill. App. 2d 258 and cases cited.

[10] *Newlin v. N.E. Tel. Co.* (Mass. 1944) 54 N.E. 2d 929.

[11] *Levonas v. Fado*, 186 Md. 16, 40 A. 2d 43, and cf. *Manaia v. Pepco*, 163 F. Supp. 671, affirmed by the 4th Circuit June 18, 1959.

[12] E.g., recovery over against the contractor on theories of indemnity relative to active and passive negligence. Cf. "The Active-Passive Test for Indemnification of a Tortfeasor in New York State," Jos. Wackerman, Esq., LILCO.

[13] See the fascinating "Claim and Loss Review" series in The Weekly Underwriter, issues of June 6 to August 1, 1959.

[14] Elliott Dunlap Smith, Carnegie Provost, mimeo Harvard Law School, November 1954.

[15] Electricity escaping from trolley wire, thence via various wires and cables to gas pipe, melting lead connection and causing fire loss: *Marsh v. Lake Shore Elec. Co.*, et al., 28 Ohio Cir. Ct. 9.

[16] Robert S. Gillespie, Ind. Ins. Co. of N.A., "Loss Prevention in the Gas Utility Business."

[17] In address to Society of Gas Operations delivered by Benjamin Fineberg at the Yale Club, February 28, 1957.

[18] "Study of Gas Explosions and Fires," NFPA Quarterly, January 1958.

This article is adapted from a talk presented at the 1959 NEGA Safety Conference.

GAS • ASSOCIATIONS

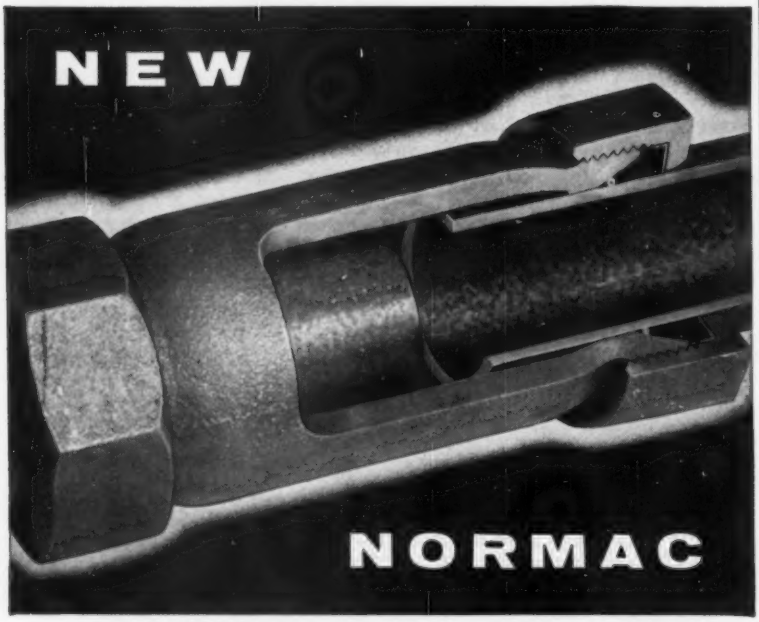
Festival of Flame will highlight AGA convention

The Festival of Flame—a display of over 200 of the latest developments in the gas industry—will highlight the AGA's 42nd annual convention, Oct. 9-12 in Atlantic City.

Christy Payne Jr., chairman of the exhibit planning committee and manager of market development for Consolidated Natural Gas System, reports the Festival will be twice as large as the Parade of Gas Progress presented at the 1958 convention.

Centerpiece of the exhibit will be a 30,000-sq ft mall-type educational display, arranged by the operating section. Exhibitors will show the newest and most important equipment and control devices used in every area of gas operations.

A number of gas companies have been invited to show significant new developments they have introduced for their own use. These include appliances, systems, methods and procedures, tools, and special devices.



MODERNIZED Extra Heavy Wall All-Malleable COUPLING Provides More Deflection Than Ever

Engineered in line with latest data on distribution pressures and installation ease. Inspect its construction and quality materials in detail. (Available with Normac INSULATING gaskets).

BRASS FITTINGS
IRON BODY COCKS
INSULATING GASKETS
SELF-LOCKING JOINTS
BELL JOINT CLAMPS
SERVICE TEES, ELLS
METER BARS
COUPLINGS

MALLEABLE SERVICE ELL Maximum stab. All sizes, with or without insulating gaskets. Also in brass 1¼ I.P.S.

BRASS FITTINGS The most complete line for copper or plastic tubing in ⅜, ⅞, 1⅛, 1⅜ O.D., 1¼ I.P.S.

Top Quality for 22 Years In Gas Distribution Equipment

Get helpful CATALOG 12. Photos, specs, detail drawings & much helpful data for modernizing or new installations.

PERMANENCY Rely on NORTON-McMURRAY for the finest! NORMAC continues to modernize and improve couplings and fittings in step with latest gas distribution demands. 22 years experience concentrated on ONE purpose . . . the BEST! Today, major gas distribution companies say "NORMAC" to define their standard of quality.

NORTON - McMURRAY Mfg. Co.
919 N. Michigan Ave • Chicago 11, Ill.

Measurement course attended by 1000

Almost 1000 representatives of operating and manufacturing companies attended the 34th annual Southwestern Gas Measurement Short Course held at the University of Oklahoma.

The three-day session, held in cooperation with the university's College of Engineering, consisted of 89 class sessions, both technical and non-technical. Registrants for the meeting came from all parts of the U. S. and Canada and Mexico.

Featured were several gas measurement equipment displays. For the first time, educational mass flow measurement equipment was exhibited.

The first course was held in 1924—with 60 in attendance. In the 34 years of its existence, some 22,650 people have attended the school.

R. R. McCafferty (right), general chairman of the 1960 course, presents chairman's gavel to R. B. Fleske, who will head the 1961 meeting. McCafferty is general pipeline superintendent for Pioneer Natural Gas Co., Amarillo; Fleske is superintendent of gas measurement for Cities Service Gas Co., Oklahoma City.

Launched with great new advertising and merchandising in: **GOOD HOUSEKEEPING, AMERICAN HOME, SUNSET and BETTER HOMES AND GARDENS** *to presell your heating prospects!*

You can afford the timeless beauty and reliability of the new
ROBERTSHAW
élégante
WALL THERMOSTAT
...Simply ask your builder or heating contractor!
Guaranteed by Good Housekeeping

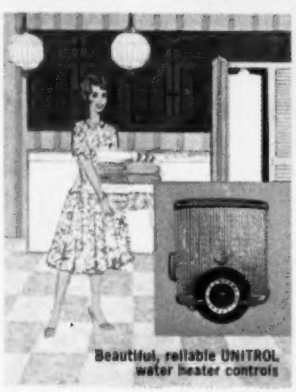
New magnetic switch—
sealed in glass—
provides trouble-free operation,
needs no leveling—

Styled slim... clings to wall large, easy-to-read dial!

Robertshaw

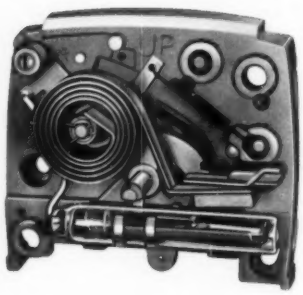
MR. CONTROLS

GRAYSON CONTROLS DIVISION, Long Beach, California

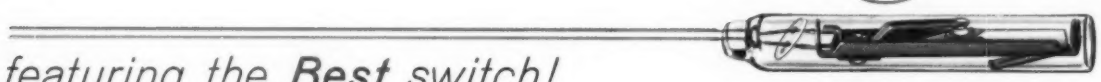

Beautiful, reliable UNITROL water heater controls

Space and central heating controls

Why there is a one best switch in central heating...



ROBERTSHAW'S new élégante



Operates in any position — needs no leveling.

*featuring the **Best** switch!*

HERE'S HOW IT WORKS:

The new Robertshaw élégante wall thermostat features an exciting new concept in low voltage switches. Sealed in glass, this patented switch (above) is actuated by a magnet brought into proximity of the contacts. Simplicity and a minimum of moving parts — plus the sealed in glass principle (protects from dust and moisture) — make the new Robertshaw élégante the most reliable wall thermostat ever developed!

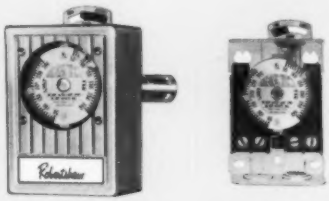
The new Robertshaw élégante wall thermostat features classic architectural design and timeless beauty which will be in style for many, many years to come.

This new switch principle guarantees long life and trouble free operation. In addition, Robertshaw's years of engineering experience in the controls industry assures consumer satisfaction.

When you specify the exciting new Robertshaw élégante, you can be sure that you are giving your customer the finest, most **tested** wall thermostat ever produced.

NEWEST, BEST
SMARTEST
MOST RELIABLE
EASIEST TO INSTALL
MOST BEAUTIFUL
MOST COMPACT
NEEDS NO LEVELING
EASY TO READ — EASY TO SET

BIGGEST CENTRAL HEATING NEWS IN YEARS!



All new full load fan and limit switch offers you more new features!

Ask about the new Robertshaw full load Fan and Limit Switch (¾ hp—14 amp.)... incorporates many new engineering ideas— saves you inventory and installation costs!

Robertshaw

GRAYSON CONTROLS DIVISION
Long Beach 5, California

Canada's safety book receives award

An Ontario Safety League Award was presented to the Canadian Gas Association for "exceptional contributions to the field of home safety."

The presentation was made by the Hon. John Yaremko, Minister of Transport and Provincial Secretary of Ontario. It was accepted by W. H. Dalton, managing director of CGA.

The association was honored for its "Home Safe Home" booklet, produced as a part of a campaign designed to decrease home accidents. More than half a million copies of the booklet have been distributed throughout Canada.

Ebdon to address measurement course

Fred Ebdon, editor of GAS magazine, will be the principal speaker at the 20th annual Appalachian gas measurement short course scheduled for Aug. 29-31. Sessions will be held at West Virginia University in Morgantown.

Ninety classroom and lecture-hall sessions will be devoted to basic as well as advance techniques in all phases of measurement, regulation and metering practices.

In addition to classroom sessions, the latest developments in the field of natural gas measurement and control equipment will be displayed. More than 50 gas equipment manufacturers will have exhibits.

Some 900 gas utility, measurement and control engineers and technical personnel are expected. They will hear R. H. Lussky of the West Virginia PSC and general chairman of the course, officially open the school. John Capito, president of the West Virginia Oil & Gas Association and vice president of United Carbon Co., will respond to the address of welcome.

Fred Ebdon

John Capito

TR

DETECTOR

locates pipeline holidays and electrical contacts underground

OSCILLATOR

RECEIVER

Problems caused by underground pipe contacts with other lines and holidays in the protective coating can be solved by the Tinker and Rasor Pearson-type Detector which locates underground shorts in coated pipelines.

This completely transistorized unit finds trouble spots underground without the necessity of uncovering the pipe. Working in tandem, a two man crew can inspect an entire line, locating coating breaks, contacts with other lines and mapping the entire line.

The TR Underground Holiday Detector operates on a 12 volt automobile battery. It generates a 15 watt, 750 cycle, stable A.C. audio-frequency signal on a pipeline. Two 750 cycle resonate filters in the receiver reject unwanted signals.

Write today for technical data and bulletin.

TR TINKER & RASOR

417 Agostino Road, P.O. Box 281 • San Gabriel, California

NGSMA elects new officers

Newly elected officers and board members of the Natural Gasoline Supply Men's Association were installed at the group's recent meeting in Tulsa.

Those taking office were: president, Ray F. Riddle, Riddle & Hubbell Co., Tulsa; 1st vice president, C. P. Stanley, Dresser Engineering Co., Tulsa; 2nd vice president, F. W. Bell, Brown & Root Inc., Houston; and treasurer, W. M. Gebo, Ingersoll-Rand Co., Tulsa. William F. Lowe was re-elected secretary.

New board members include: Fred Blackbird, Crane Packing Co., Houston; John N. Brown, Brown Fintube Co., Elyria, Ohio; C. L. Bryan, Gasoline Plant Construction Corp., Houston; A. F. Canada Jr., Pacific Pumps Inc., Huntington Park, Calif.; W. A. Carroll Jr., Burgess-Manning Co., Dallas; T. R. Cross, Paramount Supply Co., Amarillo; James E. Hughes, Western Supply Co., Tulsa; W. F. Matheny, Aimco Products Corp., Tulsa; I. Earl Nutter, Nutter Engineering Co., Tulsa; E. I. Stark, Foxboro Co., Dallas; and Rudy Zorn, Cameron Iron Works Inc., Houston.

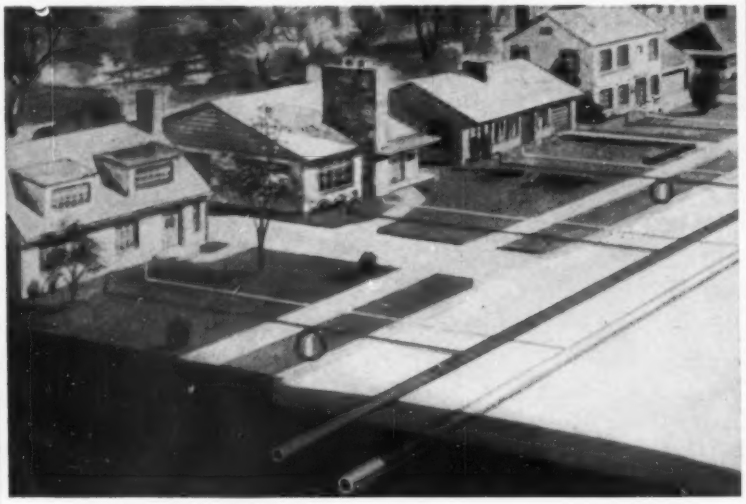
NI-Gas' Frank Lietz heads PUAA

Frank C. Lietz, advertising manager of Northern Illinois Gas Co., was elected president of the Public Utilities Advertising Association. He succeeds Warren Widenhofer, public relations director of Indiana & Michigan Electric Co.

Among other officers are Jack A. Fleming, 1st vice president, and Elton E. Stuenckel, 3rd vice president. Fleming is director of public relations and advertising for Canadian Western Natural Gas Co. Ltd. and Northwestern Utilities Ltd., Calgary. Stuenckel is sales promotion and advertising manager of South Jersey Gas Co., Atlantic City.

School dates changed

The Mid-West Gas Association has changed the dates for its 1960 annual school and conference at Iowa State College in Ames. The new dates are Sept. 27-29, instead of Aug. 17-19.



HOW TO STOP LEAKS IN GAS & WATER DISTRIBUTION SYSTEMS

The external corrosion of underground pipe is a major headache in many areas. It can cause leaks, necessitate repairs, and even create potentially dangerous conditions. Cathodic protection has proved to be a successful and economical way to stop such corrosion—on transmission and distribution pipelines, oil and gas well casing, etc.

Magnesium anodes or rectifier systems are used to project a protective current onto the line or other buried structure. For distribution systems, magnesium anodes are usually preferred for their low cost and to avoid harming other nearby structures.

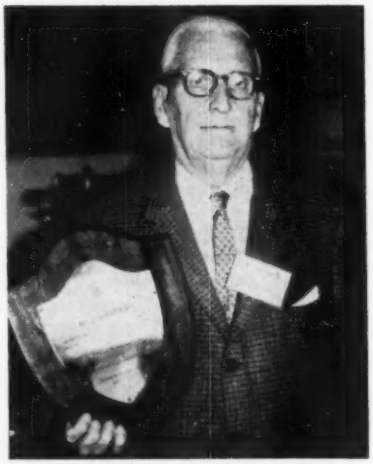
CSI engineers are pioneers in this field. They offer expert consulting and installation services, plus a complete line of brand-name materials and equipment for both anode and rectifier installations—including Dow's new high-potential Galvomag anodes.

Call or write today for estimates or quotations. Prices are competitive and there is no obligation, of course.

CSI

CORROSION SERVICES INCORPORATED
General Office, Tulsa, Okla.
Mailing Address:
Box 787, Sand Springs, Okla.
Tel. Circle 5-1351

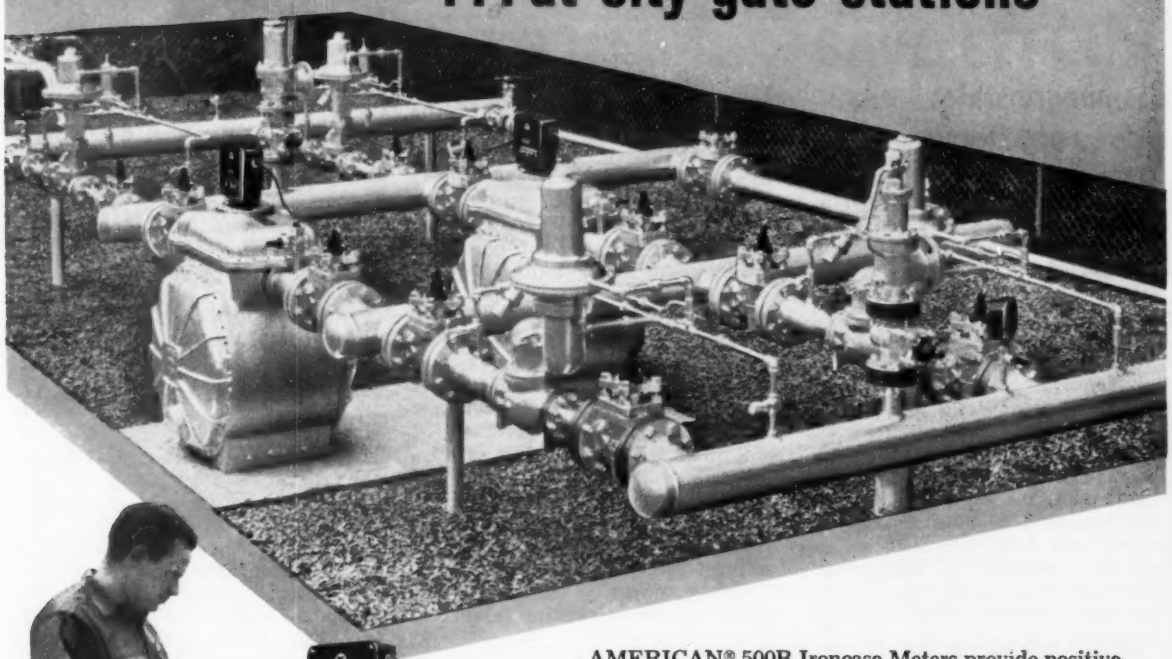
Cleveland 13, Ohio
1309 Washington Ave.
Tel. CHerry 1-7795



M. J. Harper, vice president of Rockwell Manufacturing Co., received a plaque from the AGA metering subcommittee at the group's recent meeting in New Orleans. The plaque reads ". . . in recognition of his good fellowship and many years of valuable assistance to the metering subcommittee. . . ." The presentation was made by Jim Webb, Consolidated Edison Co. of New York, on behalf of the committee at the 20th annual dinner tendered to the committee by Rockwell. Harper has been traditional host at the dinner since its inception.

HOW TO ASSURE MEASUREMENT ACCURACY

...at city gate stations



AMERICAN® 500B Ironcase Meters provide positive displacement measurement accuracy and dependability at this Granite State Transmission Company take-off station. High capacity Ironcase Meters provide accurate measurement under all conditions. Molded, 3-convolution Duramic diaphragms and other American quality features assure the economical and dependable handling for the big loads...with sustained accuracy at lowest cost. Capacities to 10,000 cfh. Working pressures to 250 psi in rugged Ironcase and to 100 psi in light weight Aluminumcase Meters.

In addition, Granite State's large Ironcase Meters are equipped with American Base Volume Indexes to provide continuous gas volume indications at base conditions on a direct reading counter. No computations are necessary to compensate for varying pressures or temperatures.

Consult your nearest representative for details on American's complete line of measurement, regulation and control equipment.

GEM

AMERICAN METER CO

AMERICAN®
METER COMPANY
INCORPORATED (ESTABLISHED 1836)

GENERAL SALES OFFICE: Philadelphia 16, Penna. • Albany • Alhambra • Atlanta Baltimore • Birmingham • Boston • Chicago • Dallas • Denver • Erie • Houston Kansas City • Los Angeles • Minneapolis • New York • Omaha • Pittsburgh • San Francisco • Seattle • Tulsa • Wynnewood

IN CANADA: Canadian Meter Company, Ltd., Milton, Ontario • Calgary • Edmonton Montreal • Regina • Vancouver

SUPPLIERS TO THE GAS INDUSTRY for Ironcase, Tinned Steelcase, Aluminumcase, and Welded Steelcase Meters • American-Westcott Orifice Meters Instruments • Reliance Regulators • Apparatus • Valves

GAS DISTRIBUTION NEWS

Gas-hungry states look to u/g storage

The importance of underground gas storage to gas-hungry northeastern states was stressed at a Detroit meeting of the Interstate Oil Compact.

One speaker was John A. Vary, chief reservoir engineer of the American Natural Gas System. He said underground storage is essential if gas is to be sold economically and competitively to a highly saturated space heating market with a climate similar to Michigan's.

Michigan has two major pipelines costing $750 million to bring natural gas from the South. "At less than one-fifth of this cost," Vary said, "our underground storage plant handles about 30 per cent of the total gas transmitted to market." And more gas can be delivered on a peak winter day than the total maximum combined capacity of the two pipelines.

What would the picture be without storage? "We would neither be able to purchase gas under prevailing take-or-pay contract provisions at favorable rates, nor supply the high peak space heating demand for gas on severe winter days—that is, at costs our customers are accustomed to enjoying."

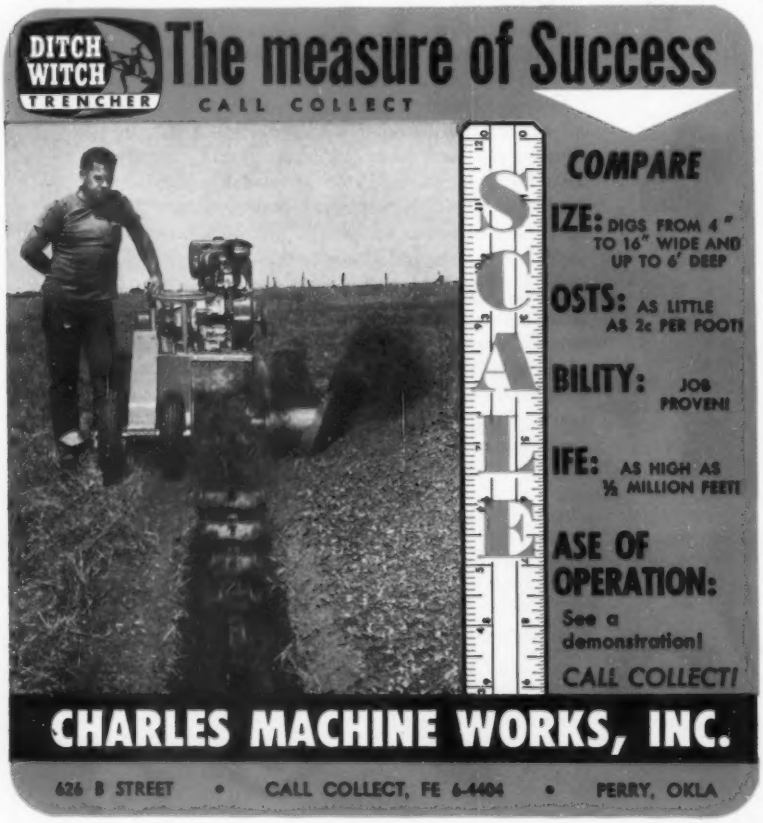
Michigan's new unitization law was discussed by Thomas Caley of the Basin Oil Co. The law permits single operation of an oil field under multiple ownership. It presents "interesting" possibilities of combining operating oil fields with natural gas storage.

Caley pointed to "some very impressive sales of entire reservoirs to the gas storage industry" in Michigan.

"Now in Michigan not only is the gas more valuable than ever . . . the reservoir itself has taken on added significance," Caley said. Many of Michigan's new reservoirs appear to be usable for both gas storage and oil production if the fields were unitized. He also believes the cost of converting a unitized field to simultaneous use for gas storage would be an inexpensive and rapid matter.

This "packaged deal" not only materially enhances its attractiveness to the gas storage company. It creates an opportunity to operate a field as a gas storage reservoir in conjunction with a pressure maintenance program, or a recycling or displacement project.

"The major handicap . . . in the past has been the huge investment required for injected gas which cannot be amortized or depreciated and is unprofitable for many, many years. If this gas can be used to temper the cold Michigan winters, however, what has been a handicap becomes an asset of great value, perhaps of more value than the original hydrocarbons in place," Caley said.


DITCH WITCH TRENCHER
The measure of Success
CALL COLLECT
SCALE
COMPARE
IZE: DIGS FROM 4" TO 16" WIDE AND UP TO 6' DEEP
OSTS: AS LITTLE AS 2¢ PER FOOT!
BILITY: JOB PROVEN!
IFE: AS HIGH AS ½ MILLION FEET!
ASE OF OPERATION:
See a demonstration!
CALL COLLECT!
CHARLES MACHINE WORKS, INC.
626 B STREET • CALL COLLECT, FE 6-4404 • PERRY, OKLA

Houston's tallest building to be cooled by gas

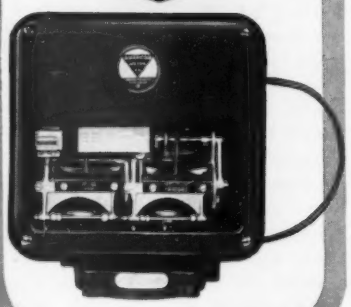
Houston's largest single commercial air conditioning installation will be in the city's tallest building.

Humble Oil & Refining Co.'s 44-story skyscraper will be heated in winter and cooled in summer with steam from gas-fired boilers. In summer the steam will provide motive power for huge turbines which will turn the air conditioning compressors.

A total of 4200 tons of air conditioning will be installed. Following a new construction trend, four 1050-ton units and the three gas-fired boilers serving them will be housed above ground level. They will be on top of the 6-story garage building located diagonally across the street from the main building.

Accurate Flow Volumes at All Times

with an American® Base Volume Index



American Base Volume Indexes register the measured gas quantity at standard conditions of base pressure and base temperature on a direct reading counter. No computations... accurate gas volumes are shown continuously and immediately.

A second counter also indicates the gas volume at line conditions. Simple operating principle... integration is continuous with all functions performed mechanically through special gearing.

Write for Bulletin 200 for complete information.

AMERICAN METER CO. EST. 1833 GAS MEASUREMENT ENGINEERS

AMERICAN® METER COMPANY

INCORPORATED ESTABLISHED 1874

General Offices: Philadelphia 16, Pa.
Sales Offices in Principal Cities

Manufacturers gets rate hike in West Virginia

West Virginia's PSC gave Manufacturers Light & Heat Co. $1.5 million of a proposed $2 million rate increase. Revenues from the higher rate, in effect since last September, must be refunded plus 6 per cent interest.

The commission said that in view of certain allowances it made, Manufacturers shouldn't seek additional revenues from it for some time. Exception: when gas purchase prices go up. The company should "plan and carry on its operations in such a way as to live within the rates . . . allowed."

Manufacturers planned to charge a differential in monthly minimum bills, based on residential heating. The commission's rejection of this accounts for the difference in amount allowed. Manufacturers wanted a $3.15 monthly minimum from customers not using gas as the sole or primary source of heat, and $4.15 from customers using gas for home heating. Under the order, $3.15 is the monthly minimum for domestic users.

Manufacturers sought a 6.75 per cent rate of return. This included net original costs for production and transmission properties and a trended approach for distribution facilities. The "weighted-average rate base" for distribution plant represents an average for the net original cost and costs trended to current-day prices.

Approved rates are designed to provide a 6.4 per cent return on an average net depreciated original cost rate base for all classes of property.

The order said commission members "recognize objections to original cost rate base, but find still further objections to the alternatives. We believe that the original cost rate base is the only one that can be calculated with accuracy" from company books.

Grove expands overseas

Grove Valve & Regulator Co., Oakland, Calif., has licensed two more European firms to produce its G-4 gate valve. They are Nuovo Pignone of Firenze, Italy, and Robert Cort & Son Ltd., Reading, England. Grove's French subsidiary, Grove France S.A., in Paris, has been producing the G-4 since early in 1958.

SAVE MONEY

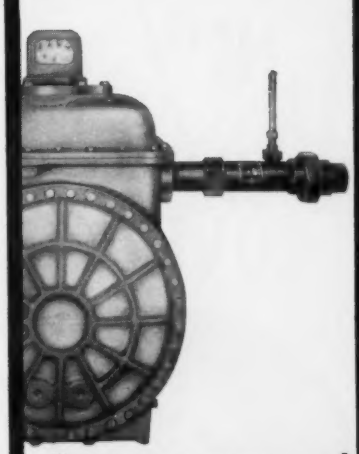
no meter set and removal expenses

SAVE TIME

on-the-spot proof testing

SAVE EFFORT

no hauling meters to shop



AMERICAN® FLOW PROVERS

Light weight and portable. Quick, accurate, in-the-field proof testing of high capacity positive displacement meters.

AMERICAN LOW PRESSURE FLOW PROVERS for testing meters with air or gas at pressures below 15 psi. Calibrated orifice discs for capacities ranging from 100 to 10,000 cfh.

AMERICAN CRITICAL FLOW PROVERS for testing high pressure displacement meters. 1000 psi maximum working pressure. Available in 2-inch size with gas capacities from 250 to 6000 cfh.

AMERICAN® METER COMPANY

INCORPORATED ESTABLISHED 1874

General Offices: Philadelphia 16, Pa.
Sales Offices in Principal Cities

Hawaii helps Alaska's gas distributor

The 50th state of the Union is helping the 49th state get on its feet—as far as the gas business is concerned.

A four-man team from Honolulu Gas Co. has been retained to help organize a new natural gas distributing company in Anchorage, Alaska.

Honolulu president James C. Stopford said Anchorage Natural is a wholly owned subsidiary of Alaska Pipeline Corp. The $16 million pipeline firm was formed by a group of Texans after a natural gas supply was found only 75 miles from Anchorage.

The Operation Anchorage team from Honolulu is being loaned to the Anchorage distributor to set up the sales and service organization.

Until now, Anchorage had only municipally owned utilities.

Plans call for completion of a 75-mile pipeline and a portion of the city distribution system by October.

Corrosion exhibits . . .

. . . highlighted the 5th annual Appalachian underground short course. A new high in attendance was reached when 600 registered at West Virginia University for the 3-day session. Chairmen for the 6th course —June 6-8, 1961—are: general, D. A. Tefankjian, Texas Eastern; program, E. K. Bensen, New York Telephone; exhibits, G. G. Campbell, West Virginia University; publicity, John H. Alm, Dearborn Chemical; registration (and secretary), R. E. Hanna, Jr., from the university.

Northern States serves new Wisconsin towns

Northern States Power Co. has Wisconsin PSC approval to offer gas service to several Wisconsin towns. Included are Eau Claire, Chippewa Falls, Menomonie, Altoon, Union, Washington, and Hallie.

NSP already provides LPG to Eau Claire, Chippewa Falls, and Menomonie.

It will cost about $55,000, NSP estimates, to convert present equipment to natural gas. NSP also estimates it will have to spend $4.2 million in the next three years on additional facilities to provide gas service.

NEW LANCASTER VALVE COVER

eliminates practically all troubles from normal sticking or lifting valves . . . Lancaster Valve Covers prevent valve squeaks with a gum-resistant ring compounded of inert, friction-free carbon-graphite. Strong and shock-resistant, this special compound is far less apt to chip or break in transit or during repair or installation.

In use, Lancaster Valve Covers provide the most level and truly concentric seat surface ever achieved.

Continual, positive contact . . . in any driving dog position . . . is assured with the large ½-inch stud that is rounded and swaged into the rugged brass shell.

*Gum-resistant ring Specially compounded of friction-free inert carbon-graphite

*Large-Profile Stud offers greater contact area

NEW, IMPROVED LANCASTER CARRIER WIRE ASSEMBLY

keeps pans moving in a straight line . . . Height is adjusted at side carrier bracket for most accurate positioning. Oval slots in new center bracket permits diaphragm to travel in straight line. Porous bronze graphite bearings are used throughout. You can order oval-slot center brackets separately and adapt them to any carrier wire.

"a meter is only as accurate as its parts"

Lancaster METER PARTS CO.

Manufacturers of Quality Parts for Gas Meters

POST OFFICE BOX 378, LANCASTER, OHIO

Gas tops electricity in heating schools

Gas heating scored a convincing victory over electricity in two upstate New York schools. Gas did twice the work at half the cost of electricity.

Site of the test was Angola, N. Y., with two functionally identical schools serving as guinea pigs. The comparative study was made by the University of Buffalo, directed by Prof. Paul E. Mohn of the School of Engineering.

The schools are located five miles apart near Lake Erie. One is heated by a gas-fired forced circulation hot water system, the other by electric unit ventilators. Each school was operated in its normal manner for the 1958-59 academic year. Degree days totaled 6859 during the heating season.

The gas heated school had higher heating load requirements and weekly use schedules. Otherwise, the buildings are functionally identical as schools.

Prof. Mohn reports that temperature at the electric school was set back to 50 deg at night and over weekends. Temperature was turned back to 60 deg at the gas school.

Although both schools were used for non-academic purposes after regular class hours, weekly use of the gas school was 30 per cent greater than the electric.

Despite janitorial services on Saturday mornings and weekly basketball games—both calling for heat—it cost $3008 to heat the gas school, compared to the $6140 at the electric school.

School board records show initial costs of the gas heating system were about $6500 less than the electric system—$138,790 for gas compared with $145,291 for electric.

The Angola study was initiated by Iroquois Gas Co., Buffalo, and conducted under the auspices of AGA's committee on comparison of competitive services.

Copies of the summary, "Gas and Electric Heating in Two Schools at Angola, N. Y.," are available from the AGA at 15 cents each.

Fisher holds 3-day meet

Fisher Governor Co. held a three-day, 80th anniversary sales meeting in Marshalltown, Iowa recently. Attending were 150 sales representatives from offices throughout the U. S., Canada, Mexico, and England.

2 NEW
RIDGID
CHAIN
WRENCHES
No. C-14 for up to 2" Pipe and Fittings
No. C-18 for up to 2½" Pipe and Fittings
give real Action-Grip in Tightest Places

Work on Round, Square or Irregular Shapes Other Wrenches Can't Reach!

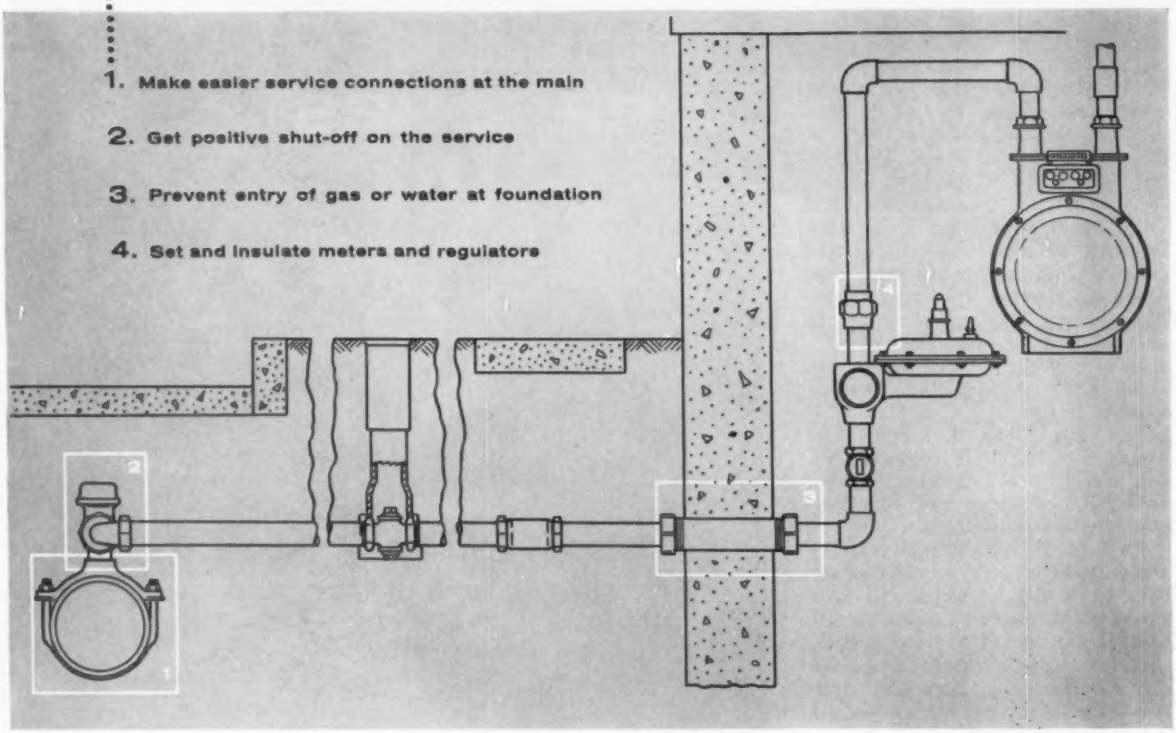
In extra close quarters, there's nothing that'll beat these new RIDGID Chain Wrenches for getting the job done. Fast, ratchet-like action in either direction . . . from either side. Give tight grip without crushing. Large, easy-to-grab end ring for fast chain adjustment. Tempered steel chain locks securely . . . releases quickly. Rugged, comfort-grip, I-beam handle, guaranteed not to break or warp . . . handy hang-up hole.

Light and easy to use, these new RIDGID Chain Wrenches do everything a regular wrench can do . . . and much more. Call your Supply House and get one today!

RIDGID

The Ridge Tool Company, Elyria, Ohio, U.S.A.

Four ways to simplify service line installations:


1. Make easier service connections at the main
2. Get positive shut-off on the service
3. Prevent entry of gas or water at foundation
4. Set and insulate meters and regulators

1. Make service connections at the main

NEW STYLE 91 SERVICE SADDLE gives you a quicker way to make permanent connections on steel or cast-iron pipe. High tensile steel straps conform snugly to the outside of the pipe; broad bearing surface prevents cutting or crushing. Available with single or double strap, tap size up to 2-inches.

2. Get positive shut-off on the service

NEW STYLE 90 CONVERTIBLE TEE (shown above with 90° Street Ell as a swing joint) serves both as a service connection or as a safe positive shut-off on pressures up to 250 psi (or 150 psi for the malleable style). Meets ASA requirements that provision always be made for sealing off abandoned services. Furnished with either threaded end or beveled for welding.

3. Prevent entry of gas or water at foundation

NEW "WALL-SEAL"...a simple leak-proof method of sealing between the wall opening and service pipe. Simply use a threaded nipple . . . and two special Dresser compression follower nuts and wedge gaskets. Eliminates the aggravation of having to pack the space with tar, rags, etc.

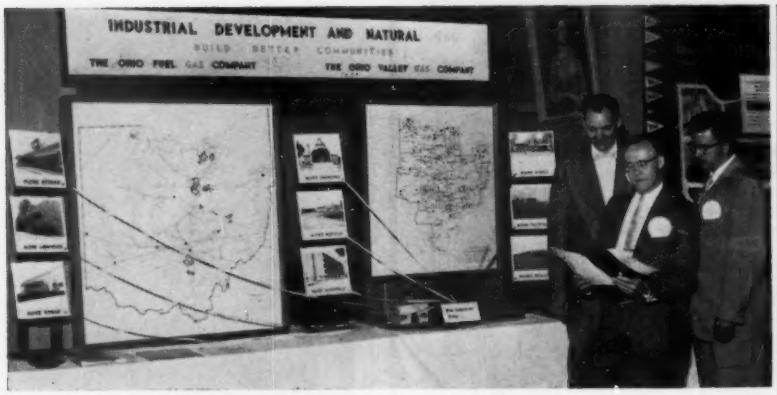
4. Set meters and regulators

NEW INSULOK ADAPTER...insulates, simplifies and speeds setting of regulators and meters. Blocks harmful flow of current between house and main. Virtually tamperproof. Can be used practically anywhere on the riser, on the high or low-pressure side of regulator...indoors or out. Facilitates pre-make-up of the riser assembly in shop or truck.

Unlike welded or threaded connections, the Dresser method gives you a non-rigid service which will absorb ordinary stresses and movement without leakage or damage. Dresser® special-compound gaskets stay resilient and gas-tight for the life of the line, And regardless of the type or location of the connection, a Dresser fitting goes on faster... the only tool you need is a wrench. The complete line of Dresser service fittings includes "a product to meet every practice."

DRESSER
MANUFACTURING DIVISION
ONE OF THE DRESSER INDUSTRIES

Bradford, Pennsylvania • Chicago • Houston
New York • S. San Francisco • Toronto & Calgary



Industrial exhibit

The important role of natural gas in community and industrial expansion is pointed up by this industrial development display. It was conceived and designed by the industrial department of the Columbus (Ohio) Group companies of the Columbia Gas System. The eye-catching layout features two maps of Ohio dotted with colored lights to indicate locations of Ohio Fuel underground storage fields, compressor stations, points of connection with out-of-state suppliers, retail towns, and division and district offices. The display was presented as part of a recent Ohio Town Meeting for Balanced Community Development sponsored by the Ohio Chamber of Commerce in Columbus. On hand were these Ohio Fuel men (from left): Earle Wathen, central district industrial engineer; V. B. Thompson, north central district industrial sales manager; and Edwin K. Foster, central district industrial engineer.

Industry safety tops

With a remarkable all-time low of 7.31 disabling injuries per million manhours of exposure, the gas industry improved its accident frequency rate for the 12th straight year.

AGA's accident prevention committee pointed out that the gas industry's unbroken record of lost-time injury reduction is the longest in U. S. industrial history. And the frequency rate just established compares with our industry's all-time high of 21.86 in 1947 and the best previous rate of 8.07, set in 1958.

AGA also reports the industry's severity rate showed a 23 per cent year-to-year improvement in 1959, making last year the second best on record.

The severity rate (number of days charged per million manhours worked as the result of disabling injuries) was 526. This compares with the all-time low of 426 in 1957 and the post-war peak of 1277 recorded in 1947.

Company experiments with remote meter reading

An investment potential report on Waters Manufacturing Inc., Wayland, Mass., reveals that the company is experimenting with remote or outside meter reading.

Waters proposes putting a miniature potentiometer on each gear of a meter. Then, with the necessary wiring, the position of each gear could be read at the other end of the wire. This could be outside the house, or at a central point to serve several houses—even a whole city.

Waters, working with American Meter, has developed the necessary devices to make this external meter reading fast, accurate, and virtually fool-proof. The only expensive item involved is the device that would have to be carried by the meter reader. According to the company, the cost of installing the potentiometers on the dials is negligible in comparison.

Thorough field testing will be carried on over the next few months to prove the value of the system.

TTP expands plant

A one-third increase in manufacturing, raw material, and warehouse space is planned by Tube Turns Plastics at its Louisville, Ky., plant. President Carl B. McLaughlin said key unit in the expansion plans is a one-story steel and masonry building adjacent to the existing plant. It will provide 6400 sq ft.

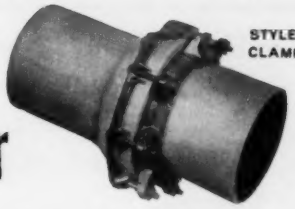
There is a Dresser®

STYLE 38 6-BOLT COUPLING

pipe coupling, fitting,

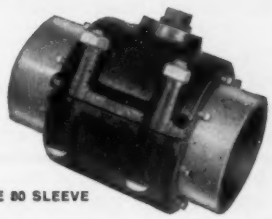
STYLE 90 STREET TEE

repair clamp, or



STYLE 60 CLAMP

repair sleeve



STYLE 80 SLEEVE

for every need

Only Dresser manufactures a complete line.

DRESSER MANUFACTURING DIVISION

Bradford, Pennsylvania

Springs PROVIDE EASIEST ACCESS TO METER & VALVE PITS!

BILCO DOORS have springs for easy opening and built-in drainage for complete weather-tightness. Available in a variety of sizes in single or double leaf design.

FREE CATALOG WITH SPECIFICATIONS AND PRICES

THE BILCO COMPANY, DEPT. A-198
NEW HAVEN 5, CONNECTICUT
Please send FREE catalog with specifications and prices on Meter & Valve Pit Doors.

NAME_____
FIRM NAME_____
ADDRESS_____
CITY_____ ZONE____ STATE____

Bilco®

DOORS FOR SPECIAL SERVICES

CLIP THIS AND MAIL TODAY
if you have not subscribed to . . . GAS

GAS 198 SOUTH ALVARADO STREET, LOS ANGELES 57, CALIFORNIA
Standard Rates Apply to U. S. & Possessions

☐ Check herewith ☐ Bill me ☐ 2 years $3.00 ☐ 1 year $2.00

Name_____ Title_____
Firm_____
Street_____
City_____ Zone____ State_____

Northwest growth

Cascade Natural Gas president O. Marshall Jones addressed his company's 2nd annual convention for gas appliance dealers and installers held in Seattle recently. He told those in attendance that gas deliveries would begin in July in the towns of Richland and Union Gap; in September in Selah. Other areas that may get gas service are Bend, Ore., and Shelton, Bremerton, and Grays Harbor, Wash.

Pennsylvanians rap FPC

Pennsylvania's PUC, while protesting strenuously to FPC, authorized Peoples Natural Gas Co., Pittsburgh, to increase its rates an estimated $1.5 million. The increase offsets higher prices paid to two pipeline companies.

H. Donald Borger, Peoples president, charged the FPC was guilty of "stalling" and "inexcusable inefficiency" in determining proper gas rates for interstate suppliers.

He said long delays (by the FPC) in reaching a decision imposed an "unreasonable and entirely unnecessary strain" on his company. He cited a history of increases by Tennessee Gas Transmission Corp. TGT's requests for higher rates before the FPC are being fought by the Pennsylvania commission. The PUC has said repeatedly that it is helpless to halt natural gas boosts passed on from producer, pipeline, and distributor to the consumer. The agency contends that the FPC should check producer prices to pipelines at the source and has urged the federal agency to follow such procedure.

Milwaukee Gas buys Wisconsin distributor

Assets of Winnebago Gas Corp., gas distributor in Wisconsin's Fox River valley, have been bought by Milwaukee Gas Light Co. Price: $2.5 million.

Winnebago, headquartered in Kaukauna, distributes natural gas in Kaukauna, Kimberly, Little Chute, and Combined Locks. When Midwestern Gas Transmission's Canadian line is completed, Winnebago will add 15 towns in seven Wisconsin counties.

Also, the company has franchises to distribute natural gas in 27 towns in 13 counties. This service is contingent upon FPC and Wisconsin PSC approval. It also must await approval of a feeder line to the Janesville area.

Completion date nears for Saskatchewan Power

Saskatchewan Power Corp. looks toward September as the completion date for its 1960 construction program involving 24 gas distribution systems in as many towns.

The program is extending gas service to towns and communities in the northeastern, southeastern, south central, and west central areas of Saskatchewan. Upon completion, 94 centers will be included. Seventy of these were completed by the end of 1959.

Minnesota expansion gets under way

North Central Public Service Co., St. Paul, is building a division office building in Coon Rapids, Minn. The building is part of the company's $2.5 million program to bring natural gas to the towns of Anoka, Blaine, Cambridge, Coon Rapids, Elk River, Lexington, Princeton, and Spring Lake Park.

North Central already has installed gas systems in Anoka, Blaine, and Spring Lake Park. Cambridge, Elk River, Lexington, and Princeton will get gas service later this year.

Allis-Chalmers builds

Construction is under way on Allis-Chalmers Manufacturing Co.'s new multi-million dollar engine plant at its Harvey (Ill.) works. The new plant, slated for completion in mid-1961, will enable Allis-Chalmers to build a broad line of diesel, natural gas, butane, and gasoline engines.

CUT 20" CAST IRON PIPE
in Less Than 8 Minutes...

...with the New REED
ROTARY CUTTERS
(4 sizes cover the range from 10" cast iron to 26" steel pipe)

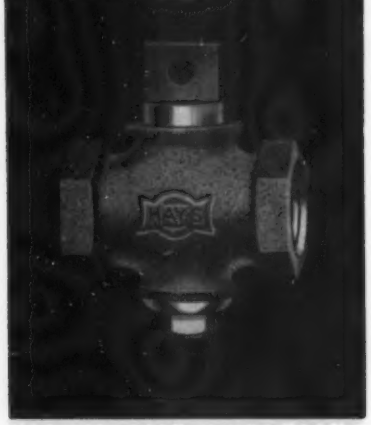
These one-man Reed Rotary Cutters cut large diameter steel or cast iron pipe *faster and better than the heaviest power machines* . . . and without electrical or explosive hazards. What's more, there's less digging in ditch-work! You need only a 4" to 6" channel under the pipe and a 45° to 60° arc for the handle swing. Reed Rotaries are easy to "carry in", too. The 20" size weighs only 68 pounds; separates into 3 easily carried parts. Patented pipe guide assures clean, right-angle cuts. Four razor blade wheels track perfectly, cut easily and are quickly interchangeable for steel or cast iron pipe.

● Write today for descriptive literature.

These typical cuts on 12, 16, 20 and 24" cast iron pipe illustrate the clean, accurate, right-angle cuts provided by Reed Rotary Cutters.

REED
REED MANUFACTURING COMPANY
ERIE • PENNSYLVANIA

HAYS®



all Brass
GAS STOPS
for...

METER SETTINGS
Flat Head • With or Less Check
Lock Wing

SERVICE LINES
Low, Medium and High Pressure

INDUSTRIAL USE
Three-Way • Graduated Dial

APPLIANCES
AND EQUIPMENT
Lever Handle • Square Head
Flat Head
A.G.A. Listed Control Valves

GENERAL PRODUCTS DIVISION
HAYS MFG. CO.
ERIE, PA.

Company to distribute gas in central Virginia

Central Virginia Gas Co. has permits from the Virginia Corporation Commission to operate as a gas distribution company. Covered by the certificates is a large area of central Virginia.

Included are sections of seven counties: Albemarle, Appomattox, Campbell, Fluvanna, Halifax, Orange, and Louisa.

Transcontinental Gas Pipe Line Corp. will supply gas to Central Virginia. FPC has approved the allocation.

Labs study table-top water heater

An experimental high recovery type, table-top gas water heater is described in a research report from the AGA Labs. The tested unit has a normal recovery rate twice as fast as contemporary models.

Research Report 1311 describes the prototype table-top water heater designed for an input of 40,000 Btuh. The unit was capable of heating 33.6 gal. of water per hour through a 100 deg F temperature rise.

"Design and Performance Characteristics of High Recovery Gas Storage Water Heaters," Report 1311, is available from the AGA Labs, 1032 E. 62nd St., Cleveland for $1. (Catalog No. 132/DR.)

Form consulting firm

A new consulting engineering company has been organized in Vancouver, British Columbia. Crippen Ruskin & Associates Engineering Ltd. is providing technical and economic feasibility studies, digital computer services, design and supervision of construction of natural gas systems, etc. Under way now is a five-year projection of operations for Inland Natural Gas.

Louisiana distributor named

Koehring division of Koehring Co. has appointed Pelican Machinery Co. as northern Louisiana distributor. Pelican headquarters in Shreveport.

Titan Valve sold

Titan Valve & Manufacturing Co., Cleveland, Ohio, has become a subsidiary of Harper-Wyman Co., Chicago. Titan, founded in 1932, produces controls for gas and electric water heaters.

you can
relax

with Southern Cross on the job!

Increased distribution profits and improved safety factors are the direct result of leak location control by SCF.

Each year literally billions of cubic feet of gas are accounted for with Vegetation Method, Safety or Combination surveys by Southern Cross. Our completely equipped, system trained repair crews stand ready to repair the leaks found if you desire.

Distribution executives nationwide verify . . . It's real r-e-l-a-x-i-n-g with Southern Cross on the job.

SOUTHERN CROSS
SCF FORESTERS
Atlanta 6, Georgia • Melrose 4-4227

Joint ownership planned

Allis-Chalmers Manufacturing Co. and Bell & Howell have agreed on joint ownership of an electronic systems engineering firm in California. Under the agreement, Allis-Chalmers will acquire 50 per cent of the common stock of Consolidated Systems Corp., Monrovia, Calif. This is a wholly owned subsidiary of Bell & Howell's Consolidated Electrodynamics Corp.

Dearborn acquires Sequoia

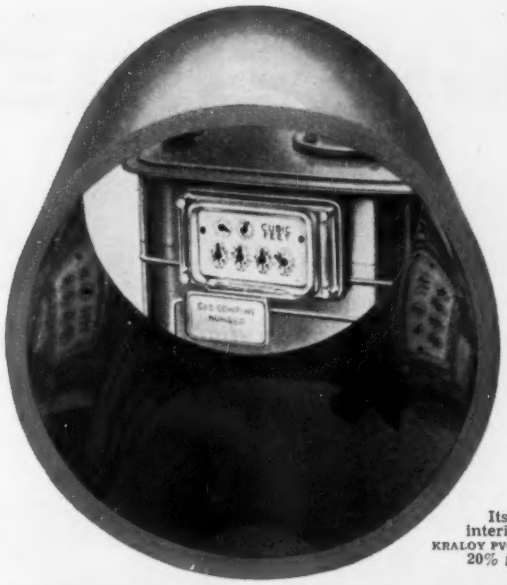
Dearborn Stove Co., Dallas, purchased the Sequoia Manufacturing Co., San Carlos, Calif. The California company will continue operations as a wholly-owned Dearborn subsidiary, manufacturing gas-fired central heating equipment.

Miracle Kitchen repeats Iron Curtain visit

Whirlpool Corp.'s Miracle Kitchen will make its second visit behind the Iron Curtain. This summer it's going to the International Trade Fair Exhibits in Poland and Yugoslavia.

Chicago construction

Eskil I. Bjork (left), chairman of Peoples Gas Light & Coke Co., and Emory A. Manlove, vice president in charge of operations, discuss route of company's new interstation main being built on Chicago's north side. Construction of the 29-mile, 36-in. main is a three-year project that will cost $23 million. The interstation main will increase capacity of present distribution system and permit greater flexibility in meeting peak demands.



Its mirror-smooth interior walls enable KRALOY PVC PIPE to deliver 20% greater volume.

PIPE MORE GAS, CLEANER GAS CUT CORROSION-REPAIR COSTS WITH KRALOY PVC PLASTIC PIPE

Increased line-flow, a definitely purer, cleaner product, and longer, trouble-free *service* — these are the outstanding results gas distribution engineers are reporting about KRALOY PVC PLASTIC PIPE. Rust, rot, corrosion, sour and dirty gas problems don't faze KRALOY. KRALOY'S unique qualities are proving themselves in both main and service pipe installations. Amazingly light (⅛ the weight of steel), KRALOY'S high impact rating and flexural strength greatly simplify transportation, handling and laying. And with the ease of cutting and joining KRALOY PVC you can then save up to 50% in installation costs!

Not affected by electrolytic action, KRALOY defies scale buildup and ground or chemical actions. Inert, corrosion-proof, KRALOY PVC *never needs painting or cathodic protection* — ends "holiday hunts" and cuts maintenance costs to the absolute minimum. Precision extruded with mirror-smooth walls for greater thru-put, free-flow KRALOY'S unchanging quality is insured by continuous rigid laboratory control. Available in all sizes from ¼" to 12" with plastic valves and fittings.

KRALOY PLASTIC PIPE CO., INC., Dept. GM-8
402 West Central Avenue, Santa Ana, Calif.

Please send me a copy of your FREE 36-page Technical Handbook on PVC Pipe.

NAME _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

NOTHING PIPES LIKE **KRALOY**

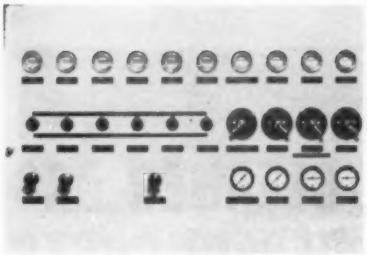
SEE OUR CATALOG IN SWEET'S

Mail coupon today for KRALOY'S free 36-page Technical Handbook on PVC Pipe, packed with information, including flow charts and corrosion resistance chart covering acids, and solutions to today's piping problems.

GAS DIGEST

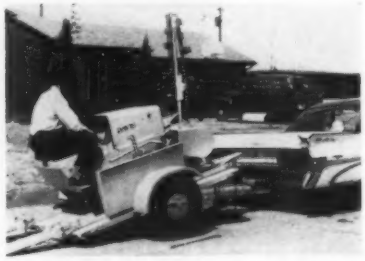
New Products and Trade Literature

For more data on any of these items use the Readers' Service Card on pages 93, 94



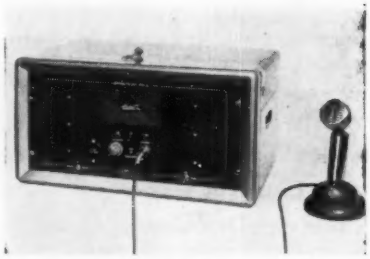
1. Engine control system

An engine control system (GEC-750) automatically starts, loads, and shuts down internal combustion engines. The system was designed specifically to meet gas compressing needs. It features safety functions to signal or shut down the engine due to malfunction of an unlimited number of measurable variables.
Fulton Sylphon Division



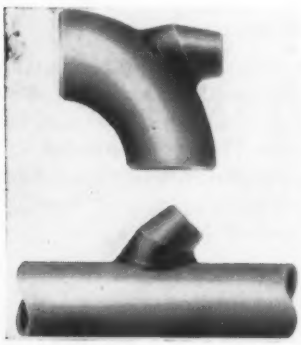
3. Utility trailer

The new Hustler utility trailer with tilting deck is designed to carry the new Davis T-66 self-propelled trencher (GEC-790). It is also adaptable to a wide variety of other transporting jobs. The Hustler pulls easily behind a car, is readily maneuverable for safe, convenient pulling on residential streets into home driveways.
Davis Manufacturing Inc.



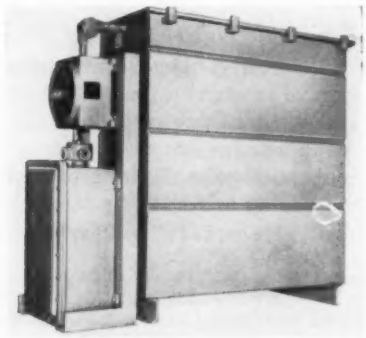
5. Two-way radio

Aerotron Model 6N100 provides a full 100 watts of power output (GEC-140). It fills the need for higher power base station equipment for VHF-FM mobile radio systems. The unit consists of an extremely sensitive receiver and a highly efficient transmitter housed in a compact, table top console.
Aerotron



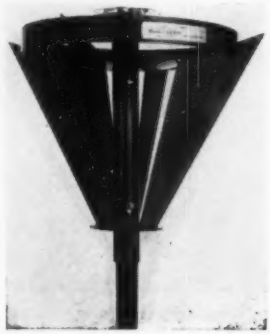
2. Angle fitting

The Elbolet is a new angle fitting for use in attaching branch outlets at bends in piping systems (GEC-370). It can also be used for angled connections to straight lines. Substantially improved flow conditions are provided. Full penetration weld even in the most acute angle section is possible with the Elbolet.
Bonney Forge & Tool Works



4. Cathodic protection

"Automatic potential control" brings automation to cathodic protection by making current adjustments automatically (GEC-110). It provides: continuous indication of protection state of the structure, regulation of applied current, retarding of coating deterioration, conservation of power and anode material, etc.
Electro Rust-Proofing Corp.



6. Gas torch

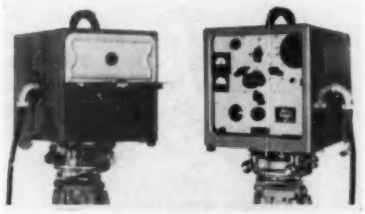
Included among three new Gaslites is the Waikiki gas festival torch shown here (GEC-470). It has a stainless steel flame-spreader designed for uniform flow at every circumference point. Arkla's new Phoenix light is designed primarily for multiple installations, such as in home subdivisions, shopping centers, motels, etc.
Arkla Air Conditioning Corp.

7. Pipe repair kit

A portable epoxy resin repair kit is for simple, economic and rapid permanent repairs to pipe, tubing, joints, fittings etc. (GEC-500). Util-Seal kit, which doubles as a carrying case, is specially suitable for minor repairs in hard-to-get-at places.
Dresser Manufacturing Div.

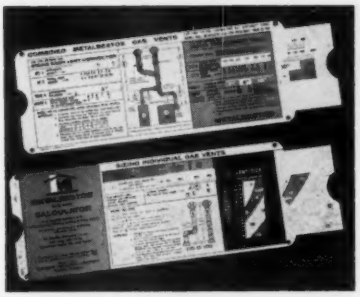
8. Pipe bevel storage

Aluminum is being used in H & M's pipe beveling machine storage boxes (GEC-770). The boxes have special fittings to hold pipe beveling machine and torch in place. They are designed to protect the machines from weather and handling damage.
H & M Pipe Beveling Machine



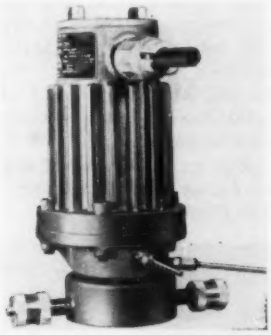
9. Surveying instrument

Improvements have been made in the Geodimeter line of electronic distance measuring equipment (GEC-540). Some features of Model 4B include: reading dial numbered to every 10 divisions; a course site; a Kerr cell heater; 20 per cent weight reduction.
Geodimeter Co.



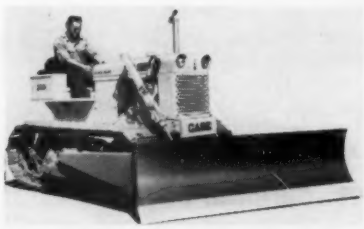
10. Vent calculator

The gas vent calculator, which fits into a shirt pocket, works out correct gas vent pipe sizes in seconds for any gas-fired appliance installation (GEC-840). Arithmetic work is practically eliminated. Works on appliances from 20,000 Btu to over 1 million.
William Wallace Co.



11. Gas density analyzer

The Whirlweigh Densitometer provides an output signal continuously and instantaneously proportional to gas density (GEC-670). It may be mounted directly on a Rotron vortex velocity type flowmeter to convert volumetric to true mass flow measurement.
Rotron Controls Corp.



12. Utility dozers

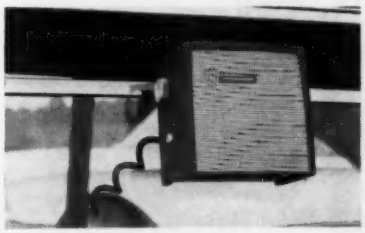
New higher output Case Utility dozer units offer either power-angling or power-tilt blades (GEC-210). These hydraulic-powered blades are offered mounted on 42-hp Utility crawlers. Operator can angle blade 25 deg left or right.
J. I. Case Co.

13. Pressure regulators

Grove's new compact, lightweight pressure regulators have capacity ranges equal to conventional regulators of much larger size (GEC-700). Available for pressure reducing, back pressure, and combination pressure reducing and relief service.
Grove Valve & Regulator Co.

14. Clothes dryers

Hamilton Manufacturing's 1961 line of dryers has two gas models—automatic ignition and constant pilot (GEC-120). Among the features are the Twin Air Streams. One stream cradles clothes gently while drying, the other carries off used, moist air.
Hamilton Manufacturing Co.



15. Speaker

A new 10-watt speaker is for use with G-E's transistorized two-way radio equipment (GEC-140). The new speaker is said to use much less battery power. Easily removed from dashboard, the speaker can be hung on car window when driver is away from car.
General Electric Co.

16. High-strength pipe

Bethlehem's new high-strength pipe is believed to be the largest ever produced to API 5 LX 52 specs. (GEC-620). OD is 42 in., wall thickness is ½ in. It is formed from a single plate, 40 ft long, welded inside and out, and hydraulically expanded.
Bethlehem Steel Co.

17. Pizza oven

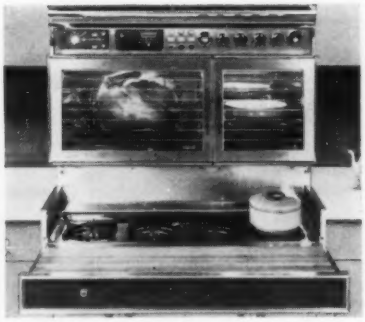
A large - capacity pizza oven, capable of baking up to 80 12-in. pies or 60 15-in. pies per hr, has been introduced (GEC-230). Compact deck size, maximum temperature of 700 deg F, and input of 65,000 Btu make possible the fast rate of baking.
Waste King Corp.

18. Ditcher

Vermeer's 3P Pow-R-Ditcher is specifically designed to fit all 3-point tractor hitches (GEC-210). New hydraulic - actuated travel ratchet device gives full control of digging speed from one lever.
Vermeer Manufacturing Co.

19. Solid state supervisory

New solid state equipment for remote indicating, telemetering and control of any apparatus which has provision for local control has been introduced by General Electric (GEC-750). The new system uses modern transistors coupled with a proven space-code type of operation.
General Electric Co.



20. Gas range

Large all-chrome oven, separate broiler, and four top burners are contained in Tappan's 40-in. "400" range (GEC-240). The range can be mounted on a metal or wood cabinet or hung on the wall.
Tappan Co.

21. Curb box lid

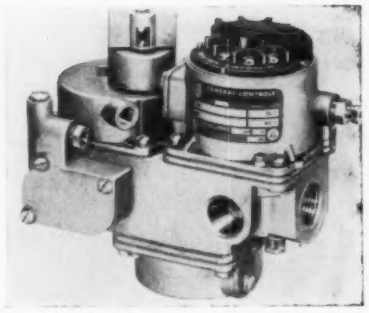
A new curb box lid adapter will repair broken flanges, stripped threads, split curb boxes, and short installations (GEC-820). According to the manufacturer, Carbide Products, the curb box lid adapter has been laboratory and field tested by a large gas distributor, and approved for use on its system.
Carbide Products Inc.

22. Inspection kit

Magnaflux and Magnaglo materials are combined in small, portable testing kits for detecting cracks on welds, piping, valves, etc. (GEC-455). They come in pressurized spray cans and plastic squeeze bottles.
Magnaflux Corp.

23. Corrosion inhibitor

Dearborn 860 is a non-toxic corrosion inhibitor for use in both open recirculating and once-through cooling systems where toxic contaminants are not permitted by state and local regulations (GEC-170). It provides rapid control of localized pitting as well as general corrosion.
Dearborn Chemical Co.



24. Combination valve

Versatrol meets varying demands of users of automatic gas control valves (GEC-820). It can be used on a wide variety of gas-fired equipment. Operators for main gas thermostatic control and pressure regulation can be added, removed, or interchanged.
General Controls Co.

25. Desulfurizing unit

Sweet-A-Mine is a simplified, amine-type gas desulfurizing unit (GEC-655). It performs unattended without any utility requirements other than supply gas pneumatic-operated valves and fuel gas for the reboiler. Capacities begin at 500 Mcfd.
Maloney-Crawford Tank

26. Cross-country trencher

A new Trenchliner has been designed especially for cross-country pipeline jobs (GEC-210). The Parsons 420 has a big 12-ft, 8½-in. diameter wheel that cuts a trench up to 7½ ft deep and 48 in. wide.
Parsons Co.

27. Remote control

A new type of off-the-shelf equipment is designed for application to remote control and data monitoring problems in the pipeline industry (GEC-750). The general purpose unit can solve about 80 per cent of pipeline and production control problems, without additional modification.
International Controls Corp.

FOR *FREE* INFORMATION

about New Products in this issue . . .
or to get the Trade Literature offered . . .

use these time-saving READERS' SERVICE CARDS

Your inquiries electronically processed by UNIVAC for high speed service to you

Each New Product or Trade Literature item reviewed in this issue is numbered. To get more information about items that interest you, circle the corresponding number on the Readers' Service Card, then PRINT your name, title, company and address PLAINLY and drop the card in the mails. No postage is needed.

USE THESE POSTAGE FREE POST CARDS

Circle the Item Number and PRINT plainly

FIRST CLASS PERMIT NO. 36 Philadelphia, Pa.

BUSINESS REPLY MAIL
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

GAS Readers' Service Dept.

c/o UNIVERSITY OF PENNSYLVANIA
THE COMPUTER CENTER
P. O. BOX 8204 — 30TH STREET STATION
PHILADELPHIA 4, PENNSYLVANIA

GAS READERS' SERVICE DEPARTMENT

Please send me further information about the items circled below . . .

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64	65	66	67	68	69	70

• *PLEASE PRINT*

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____ CITY & STATE _____

August, 1960

• Void after 90 days

UNIVAC SERVICE
Electronic Processing of Inquiries

FOR *FREE* INFORMATION

about New Products in this issue . . . or to get the Trade Literature offered . . .

use these time-saving READERS' SERVICE CARDS

Each New Product or Trade Literature item reviewed in this issue is numbered. To get more information about items that interest you, circle the corresponding number on the Readers' Service Card, then PRINT your name, title, company and address PLAINLY and drop the card in the mails. No postage is needed.

UNIVAC SERVICE
Electronic Processing of Inquiries

GAS READERS' SERVICE DEPARTMENT

Please send me further information about the items circled below . . .

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64	65	66	67	68	69	70

• ***PLEASE PRINT***

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____ CITY & STATE_____

August, 1960 • **Void after 90 days**

Circle the Item Number and PRINT plainly

FIRST CLASS
PERMIT NO. 36
Philadelphia, Pa.

USE THESE POSTAGE FREE POST CARDS

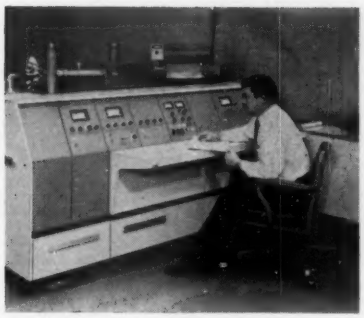
BUSINESS REPLY MAIL
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

GAS Readers' Service Dept.

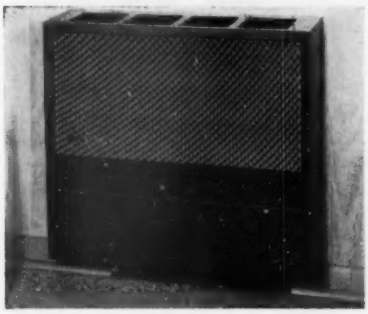
c/o UNIVERSITY OF PENNSYLVANIA
THE COMPUTER CENTER
P. O. BOX 8204 — 30TH STREET STATION
PHILADELPHIA 4, PENNSYLVANIA

TRADE LITERATURE



28. Mass spectrometer

CEC's high resolution mass spectrometer permits exploration into a wide variety of specialized materials - research problems. (GEC-460). Uses include analyses of gases and liquids with components differing in mass by as little as one part in 2500.
Consolidated Electrodynamics



29. Gas heater

Coleman's new through-the-wall vent gas heater is offered with input ratings of 22,000 and 30,000 Btu (GEC-420). Its combustion chamber is completely sealed. Products of combustion are discharged directly to the outdoors.
Coleman Co.

30. Vent display

Flex-Vent display demonstrates the clothes-dryer venting kit from Flexible Tubing (GEC-840). Flex-Vent line includes weatherproof, all-aluminum ducting and vent hoods.
Flexible Tubing Corp.

31 Aluminum meters

Four bulletins give specifications on five American lightweight Aluminumcase meters (GEC - 560). Bulletin 304 covers AL-175 and AL-250 meters, for normal domestic services. AL 800, rated at 800 cfh, for use on medium-size commercial and industrial loads, is covered in Bulletin 314. Bulletin 304 covers LPG meters. Bulletin 315 describes a 225-cfh aluminum meter for household heating loads.
American Meter Co.

32. Mass spectrometer

A six-page bulletin describes a new laboratory mass spectrometer, designed especially for laboratory analysis (GEC-460). Model 21-130 is a medium-price unit which approximates the performance of the larger mass spectrometers.
Consolidated Electrodynamics

33. Pressure regulator

Complete information on sliding gate pressure regulators is presented in a new 8-page bulletin (GEC-700). In Catalog J160-1, OPW-Jordan describes applications of each of the four basic regulators and how each works.
OPW-Jordan Corp.

34. Two-way radio

Two-way radio bulletin No. ECR-497B shows communication equipment available from General Electric (GEC-140). The 24-page publication describes frequency allocations and the various combinations of two-way radio possible in each frequency. Also shown is the difference between tubed equipment and transistorized models, and how capital investment may be held down through building-block design.
General Electric Co.

35. Pipe-making machine

The Heliweld spiral welded pipe-making machine is covered in an 8-page bulletin (GEC-620). Outstanding features of the machine are illustrated and descriptive operational information is presented. Two machines are available. Standard Type A has a range of 6 to 24 in. OD, suitable for a maximum OD of 40 in. when additional tooling is supplied. Standard Type B has a range of 16 to 56 in. OD, suitable for a maximum OD of 100 in. with additional tooling.
Intercontinental Enterprises

36. Data processing

How smaller utilities can take advantage of electronic data processing is presented in a new brochure (GEC-180). The booklet describes how these utilities can use Univac service centers for electronic billing, heretofore available only to larger firms.
Remington Rand

37. Engine oils

A technical bulletin from Sun Oil describes 2-cycle engine oil (GEC-490). Specifications, advantages, and test results are presented. The oil is designed to minimize spark-plug fouling, exhaust port plugging, piston lacquering, ring sticking, and piston scurring.
Sun Oil Co.

38. Reducing costs

How cutting edge costs can be reduced is the subject of a 12-page illustrated booklet (GEC - 210). "Best by Job Test" is the title of the 2-color booklet which presents reports on various types of cutting edges.
Caterpillar Tractor Co.

39. Clothes dryer

"When Is a Dryer More Than a Dryer" is a 32-page booklet describing numerous clothes dryer uses (GEC-120). Bulletin D-960 presents ideas developed by users of Norge clothes dryers.
Norge Div.

40. Light-wall tubing

Wolverine has published an 8-page, 2-color brochure on a new seamless light-wall tube, called Strubing (GEC-810). To be produced by the company in most metals, the tubing is processed in strip form and rolled up for compact shipping.
Wolverine Tube Div.

41. Holiday detector

Tinker & Rasor's portable dampclimate, pulse-type holiday detector (GEC-110) is described in Bulletin EP. Adaptable for large and small diameter pipe, the detector works on coated and wrapped surfaces.
Tinker & Rasor

NEW
Arno®
PIPE-WRAP TAPE

Positive Protection for Buried Pipe

Here's pipe protection by the roll. Pipe-Wrap is made of stretchy, inert polyethylene with a pressure-sensitive adhesive to provide a tough, continuous barrier against rust, acids, alkalis and electrolytic currents. Saves time and money.

MANUFACTURERS AGENTS WANTED FOR SOME SELECTED AREAS

SEND FOR FREE SAMPLE

Arno® ADHESIVE TAPES, INC.
Dr. Scholl's Adhesive Tape Division
4156 Ohio Street, Michigan City, Indiana

GAS·PEOPLE

THOMAS WEIR, vice president and general manager of Union Gas Co. of Canada Ltd., Chatham, Ont., retired last month. Weir, who also held similar posts with Ontario Natural Gas Storage and Pipelines Ltd., continues as a member of the board. He is succeeded as general manager by F. R. PALIN, currently assistant general manager, secretary and treasurer. Palin retains the office of treasurer, but is succeeded as secretary by J. W. S. MCOUAT.

CHARLES S. CANFIELD JR. has joined Holan Corp., Cleveland, as district manager in York, Pa. He will direct activities in parts of Delaware, Maryland, New Jersey, Pennsylvania, and the District of Columbia.

H. WHITCOMB NICOLSON, assistant to the vice president in charge of gas operations, Public Service Electric & Gas Co., Newark, has retired after 41 years with the company. Nicolson started in 1919 as a cadet engineer in the Market Street gas plant. He served as general superintendent of distribution from 1947 until 1957, when he became assistant to the vice president.

F. R. Palin
Union Gas

J.W.S. McOuat
Union Gas

Alfred H. Doud
Rochester

Gilbert Bell
Sprague

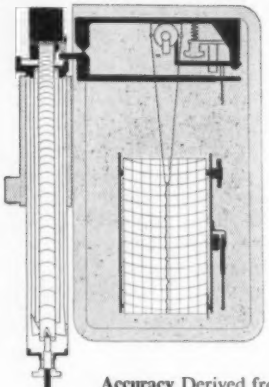
ALFRED H. DOUD has been named director of public relations by the Rochester (N. Y.) Gas & Electric Corp. Doud, who joined Rochester in 1924, served most recently as associate director.

GILBERT N. BELL has been named vice president-general manager of Sprague Meter Co., Bridgeport, Conn. Before joining Sprague in 1951, Bell was with Consumers Power Co., Detroit, for 20 years. In April 1953 he was named field sales manager at Sprague; in 1958 he became general sales manager.

DAVID C. VAUGHAN has joined Honolulu Gas Co. as special assistant to the secretary-treasurer.

FRED A. SHULER has rejoined Ohio Fuel Gas Co. as an industrial engineer, working in the company's central district.

CHARLES H. PETEK, superintendent of general accounting, Washington Natural Gas Co., Seattle, has been named assistant treasurer.



Sigma Calorimeter

ACCURATE, DEPENDABLE

LOW IN COST

Calorific values of all combustible gases from 80 B.T.U.'s and up are read and recorded by the Sigma Mark II Recording Calorimeter. Its economy and performance are unmatched by any other similar instrument.

Accuracy Derived from a unique but simple design. Provides immediate and automatic compensation for wide variations in specific gravity, temperature and atmospheric pressure.

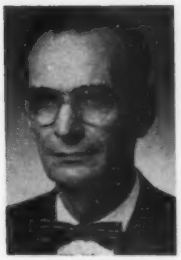
Low Cost Initial cost is extremely low. Compare it. Maintenance is negligible. Drive mechanism is fully jeweled. No other continuously moving parts to wear out. Serviced quickly by unskilled personnel.

Highly Adaptable Records calorific value of natural gas, coke-oven gas, producer gas, blast furnace gas, water gas, L-P gas, coal gas, and many others. Suited for wall or panel mounting. Takes little space. With special equipment can also record between 0-80 B.T.U.'s.

Write For More Information

COSA *National Representatives for Sigma Instrument Co., England*

Cosa Corporation, 405 Lexington Avenue, New York 17, N. Y.



R. T. Hlavin
Maxitrol

Joan Corliss
NI-Gas

R. T. HLAVIN has been promoted to assistant sales manager of Maxitrol Co., Detroit. Until his recent appointment, Hlavin was Maxitrol sales representative in the Midwest. In his new post, he will supervise sales training and promotion.

MRS. JOAN PILOT CORLISS has been named home service director for Northern Illinois Gas Co. She succeeds MRS. KARIN MORSCH HANSEN, who is retiring. Mrs. Corliss joined NI-Gas in 1956 and served in the company's central division.

ALVIN M. BROWN has been promoted to chief engineer at Ohio Fuel Gas Co.'s Crawford compressor station at Sugar Grove, Ohio. He replaces RUSSELL H. SHEETS who retired in June.

E. H. MATTSON has joined the Houston Corp., St. Petersburg, Fla., as staff commercial sales representative. Mattson spent 23 years with South Jersey Gas Co. and its predecessor, the Atlantic City Gas Co. For the past six years he was manager of merchandise and commercial sales. W. J. SMITH is staff industrial engineer in Houston Corp.'s commercial and industrial sales department.

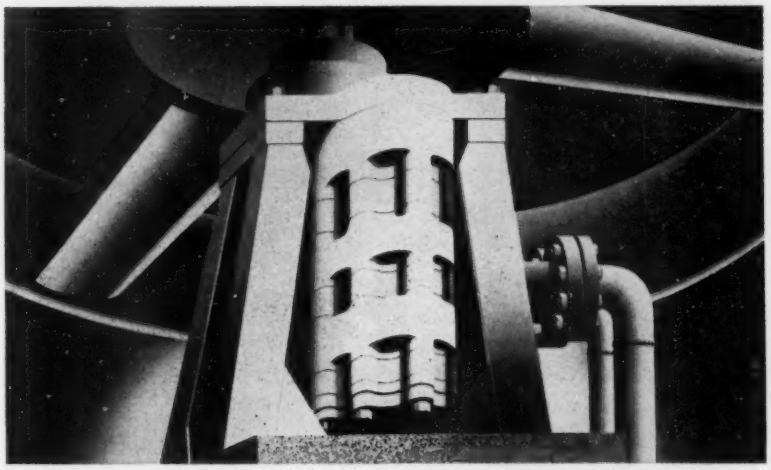
JACK S. PETTERSEN is director of marketing for the Norge division of Borg - Warner Corp., Chicago.

PAUL W. WEBER has joined Michigan Consolidated Gas Co., Detroit, as director of public information. Weber formerly was press secretary to Michigan's Governor Williams and was the public information director of the Michigan Civil Service Commission.

ROBERT A. HIMMELMANN has been named assistant manager of the industrial sales department of the Peoples Gas Light & Coke Co., Chicago. Himmelmann, who joined Peoples Gas in 1949, has been director of the industrial utilization section of the department.

JOHN H. TYLER, former vice president of the Norwood Gas Co., has moved to Malden, Mass. to become assistant to the president of the gas companies of the New England Electric System. He succeeds the late ROBERT H. PATTERSON. A. J. FABIANI succeeds Tyler as vice president and manager of Norwood.

Whirlpool Corp., St. Joseph, Mich., has formed a refrigeration products division, bringing the company's manufacturing facilities at St. Paul, Minn., and Evansville, Ind., under the administrative supervision of a vice president, refrigeration products. Named to this new post is JOHN PLATTS, presently vice president and general manager of the Evansville division. KENNETH C. WILLIAMS succeeds Platts as general manager at Evansville. JAMES BOURQUIN has been named general manager of the St. Paul plant.



New design features increase flexibility of Berry Hydraulic Fan Drives

ELIMINATE BELT, SHEAVES AND GEAR BOXES

- Both pumps and motors offered with 21 standard internal gear ratios. Pumps now directly connected at prime mover speeds from 250 to 1750 RPM. Motors now directly connected to fans, water pumps, etc., operating from 100 to 2000 RPM.
- Fans may be directly mounted on the shafts of gearhead units.
- New bearing configuration . . . incorporated to give virtually unlimited operating life on temperature controlled systems.
- Shouldered shafts to facilitate installation of fans, couplings, etc.
- Right or left hand manifolding for ease of piping.

Berry Hydraulic Fan Drive systems are now in use by more companies than any other make . . . installed in attended and unattended main line stations, booster stations, field compressor stations, as well as in gasoline plants and refineries. Mail coupon today for more information on Berry Fan Drives.

Berry HYDRAULICS
A DIVISION OF THE OLIVER TYRONE CORPORATION

General Sales Office:
Oliver Building, Pittsburgh 22, Pa.
Southern Sales Office and Plant:
Corinth 1, Miss.

MAIL FOR FAN DRIVE DATA
BERRY HYDRAULICS
2229 Oliver Building, Pittsburgh 22, Pa.
Please send data on Berry Hydraulic Fan Drives to:

Name_____
Company_____
Address_____
_____

EDNA POYNER has been named assistant home service director for the Norge division of Borg-Warner Corp., Chicago. She will direct the national Norge home service field staff and coordinate factory-distributor home service activity.

CHARLES M. STURKEY is retiring this month as president of Washington Natural Gas Co., Seattle. His successor is WILLIAM P. WOODS, vice president of Stone & Webster Service Corp. Sturkey joined Washington Natural (then Seattle Gas Co.) as vice president and general manager in 1943. In 1955 he became executive vice president and general manager, and in 1956 was elected president. As president of Conversion & Surveys Inc., Woods was in charge of the conversion from manufactured to natural gas for both Washington Natural and Northwest Natural of Portland, Ore.

J. ROWLAND DOYLE has joined Cleveland Trencher Co. as chief engineer. Formerly, Doyle was assistant chief engineer of the Oliver Corp.

C. M. Sturkey
Wash. Nat

W. P. Woods
Wash. Nat

J. D. Mayson
Dresser

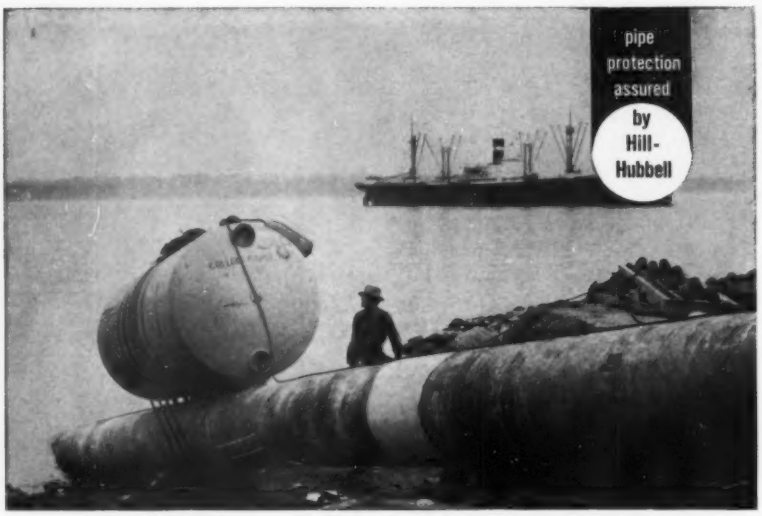
J. R. Doyle
Cleveland

J. D. MAYSON has been promoted from secretary to vice president and secretary of Dresser Industries, Inc., Dallas. In his new post, Mayson will direct legal, tax and insurance activities for Dresser.

JAMES L. TUTTLE has been named vice president and operating manager of Ohio Gas Co., Bryan, Ohio. Tuttle joined the company in 1947 as service manager. In 1949 he became distribution superintendent, and in 1952 became general superintendent.

ARTHUR G. BAITZ has been named to the new post of director of engineering planning for the Robertshaw-Fulton Controls Co., Richmond, Va., Baitz formerly was with Robertshaw's Fulton Sylphon division as director of sales.

M. F. GRACE has been named product sales manager, central heating controls, for the Grayson Controls division, Long Beach, Calif. Since 1955, Grace has been in Chattanooga as district sales manager for Grayson. Prior to that, he served in Dallas as district sales manager, and as a Grayson sales representative in the Los Angeles area. In his newly created post, Grace will work nationally from the division's headquarters in Long Beach.



vital narrows crossing *fully protected*

This underwater pipeline across New York Harbor "Narrows" will serve Brooklynites for many years, thanks to optimum corrosion protection applied by Hill-Hubbell.*

Underwater or underground, long, trouble-free service is assured if you specify Hill-Hubbell — the name synonymous with quality in mill coated-and-wrapped pipe.

*Pipe in photo weighted with concrete covering over Hill-Hubbell protection.

Specify Hill-Hubbell wrapped pipe on your next job . . .

HILL·HUBBELL
DIVISION OF GENERAL PACIFIC CORP.
3091 MAYFIELD RD. · CLEVELAND 18, OHIO · YELLOWSTONE 2-7535

1897 1960

PIPE STOPPERS OF ALL KINDS

SAFETY GAS MAIN

STOPPER CO. INC.

GOODMAN
USED SINCE 1897
2" HANDLE & LOCKING SLEEVE
GAS MAIN STOPPER

523 Atlantic Avenue
Brooklyn 17, N. Y.
Cable Address GASTOPPER, N. Y.

James Tuttle
Ohio Gas

M. F. Grace
Grayson

A. G. Baitz
Robertshaw

Richard Burke
Roper

RICHARD S. BURKE has been elected president and director of the Geo. D. Roper Corp., Kankakee, Ill. STANLEY H. HOBSON, who has been both chairman of the board and president, continues as board chairman. Burke has been operating assistant to the president of Sears, Roebuck & Co. since 1956. Roper also announces the election of HARRY SAHLIN as vice president and controller. Before joining Roper in March as controller, Sahlin had been controller of the David Bradley Manufacturing Works of Sears, Roebuck.

HARRY F. SMITH, investment banker of Omaha, Neb., has been elected to the board of directors of Washington Natural Gas Co., Seattle.

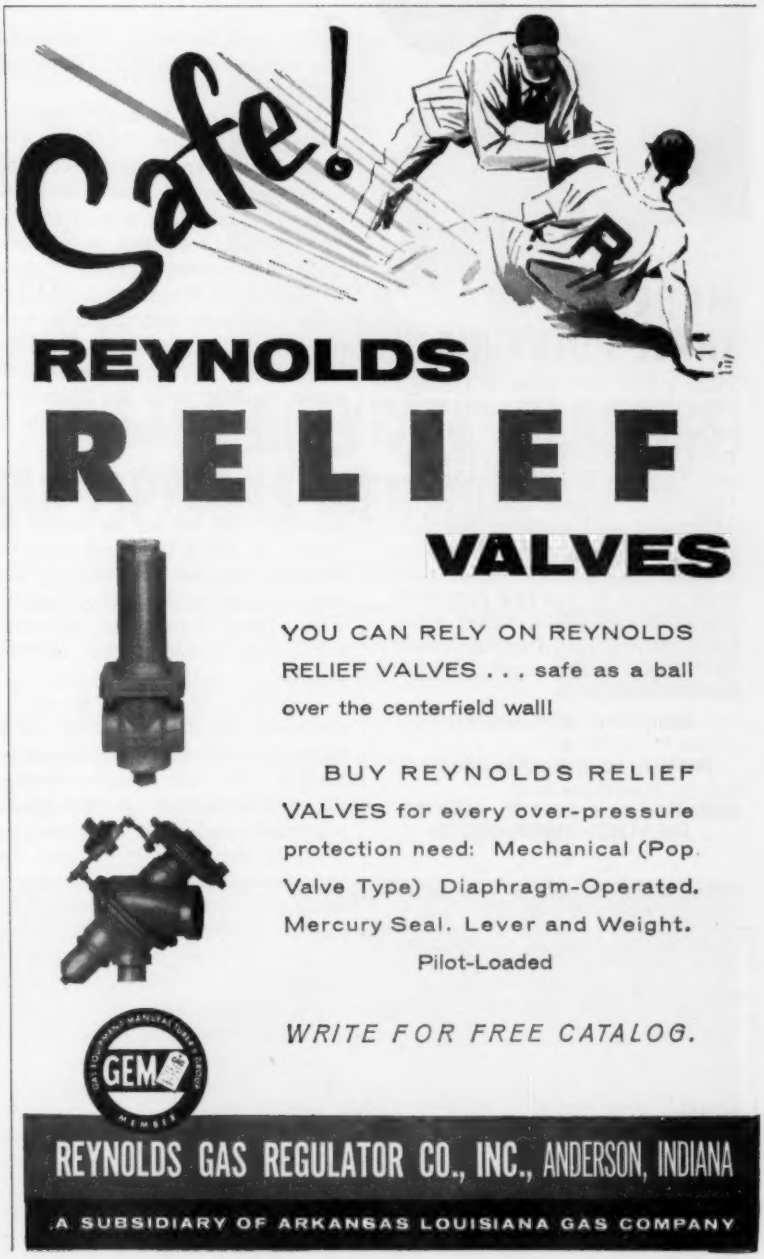
Briefs

R. D. BROWN named western regional manager, Pasadena, Calif. for Hills-McCanna Co., Chicago, and WILLIAM LOOMIS named sales engineer in San Leandro, Calif. . . . ARCHER WOMBACHER named national sales manager, Panellit Service Corp., Skokie, Ill. . . . KENNETH GNADT, manufacturers representative of the Payne Co. in Colorado and Wyoming . . . GEORGE M. MCCLURE named chief of applied mechanics research at Battelle Memorial Institute.

JOHN C. GIBBS named senior vice president, JOSEPH E. GRIFFIN named vice president and treasurer, ISHIER JACOBSON named vice president, Citizens Utilities Co., Stamford, Conn. . . . THEODORE E. CASSELMAN JR. and WILBUR S. ROBERTS JR. named vice presidents of Stone & Webster Engineering Corp., New York . . . JAMES E. MURRAY elected chairman of the board and principal executive officer and HUBERT E. BRAUNIG named president of Central Illinois Electric & Gas Co., Rockford, Ill. . . . A. H. MCARN joined the engineering service department of A. M. Byers Co., Pittsburgh . . . JULIAN B. MCFARLAND named manager of the Houston plant of Pennsalt Chemicals Corp., industrial chemicals division.

Deaths

WILLIAM H. KEARNEY SR., 80, pioneer gasman. Kearney joined a predecessor of United Gas Corp. in 1924. In 1931 he became pipeline superintendent at Houston and later held the post of district pipeline superintendent and district manager. In 1945 he was named chief inspector for United Gas Pipe Line in the company's Shreveport office. He retired in 1946.


Safe!
REYNOLDS
RELIEF
VALVES
YOU CAN RELY ON REYNOLDS RELIEF VALVES . . . safe as a ball over the centerfield wall!
BUY REYNOLDS RELIEF VALVES for every over-pressure protection need: Mechanical (Pop Valve Type) Diaphragm-Operated. Mercury Seal. Lever and Weight. Pilot-Loaded
WRITE FOR FREE CATALOG.
GEM
REYNOLDS GAS REGULATOR CO., INC., ANDERSON, INDIANA
A SUBSIDIARY OF ARKANSAS LOUISIANA GAS COMPANY

And NOW . . . Another All-New VERMEER POW-R DITCHER

MODEL 3P THREE POINT HITCH

Here's the new Pow-R-Ditcher that hundreds of contractors, municipal and utility officials have been asking for . . . the rugged Vermeer Model 3P. Revolutionary in design, the 3P is inexpensive and easy to operate. Fits all standard 3-point tractor hitches and features an all-new *hydraulic actuated forward travel ratchet device* that gives full control of digging speed from one control lever. Highly maneuverable.

DIGS 6" to 16" WIDE—4½' DEEP

•

INSTALLED OR REMOVED IN MINUTES

•

IDEAL FOR LAYING GAS PIPE, WATER AND CABLE LINES—DIGGING FOOTINGS

•

MAIL COUPON for complete information, low price and descriptive literature.

Please send me complete information on the all-new Model 3P Pow-R-Ditcher

NAME .....

TITLE OR DEPT. .....

FIRM .....

ADDRESS .....

CITY ..... STATE .....

VERMEER MFG. CO.
1441 W. WASHINGTON • PELLA, IOWA

Washington • *Cont'd.*

from page 13

entitled to only three miles of submerged lands.

The gas and oil involved in this dispute will be produced in any event. The dispute is whether the states involved or the federal government gets the royalties. A prolonged battle could stop this production, and the states-vs-federal fight could again involve the gas and oil industry in a sticky public relations battle.

THE coal industry is increasing the tempo of its drive to regain customers.

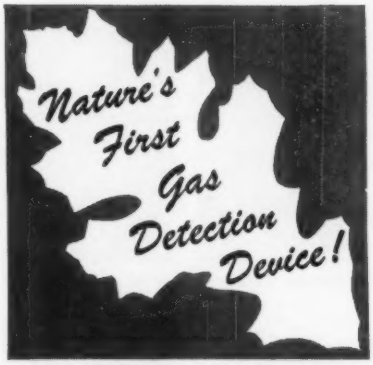
In one week recently, the coal boys through the National Coal Policy Conference pleaded for public support for a congressional fuels policy in full-page advertisements in several big eastern newspapers. Then they hauled a group of about 40 important Washington and Chicago newspaper and magazine writers on an all-expense-paid three-day trip to coal mining areas of three states to show them the "fabulous" job the coal industry is doing in modernization.

This is a slightly bigger than normal burst of public relations activity. But it's by no means unusual. At about the same time, the industry opened a handsome new coal building in the nation's capital with a blast of publicity, entertainment, and speeches by national figures.

Publicity, of course, is only a shell and has little meaning unless there is something of substance behind it. The coal industry is making serious efforts to back up its pitchmen—and with some success.

While the price of natural gas and also oil tends to rise due to various uncontrollable factors, including the cost of government regulation, the price of coal is holding steady and production costs are creeping downward. It is this combination of trends on which the coal boys bank in bringing them success in the battle.

They confidently boast that more than a quarter-billion dollars has been spent for modern, efficient mining machinery in the past 10 years, permitting one miner to produce twice as much as his counter-



And still a useful indicator of Gas leakage. The characteristics of leaves and other vegetation give the trained observer much valuable information — But infallible accuracy in finding Gas leaks *demands* more.

Heath V Type Leakage Control Surveys take the guess-work out of nature

Today's Heath V Type Leakage Control Surveys for residential areas are the result of over 25 years experience under all types of conditions. The Heath System combines the use of modern testing devices, complete inspection and analysis of vegetation and soil conditions by highly skilled experts.

Heath V Type Leakage Control Surveys result in Safety - Savings - Efficiency

Location and classification of leakage will benefit your system in many ways — Greater safety — Greater efficiency of your maintenance and repair program and Savings that result from the reduction of "unaccounted for."

For complete information on how a HEATH V TYPE LEAKAGE CONTROL SURVEY can benefit your Company, contact us at —

Safety Service That Saves Gas

HEATH
Survey Consultants, Inc.
CEdar 5-6660
Zero Laurel Ave. Wellesley Hills 81, Mass.

part did when this program started. New systems cut the fuel, carry it to the surface, break it, sort it, wash it, and load it into coal cars with only a few hands to run the machinery and install mine roofs.

Huge strip-mining shovels which chomp off from 120 to 240 feet of earth in a single bite are drastically reducing coal production costs, they claim.

One way the coal industry can get help from the government in its battle for business is for government to control sales of natural gas for industrial use and imports of residual fuel oil. They're working hard to achieve these ends in Congress, before the Federal Power Commission, and before the executive agencies of government.

They made some headway this year in their controversial bid for a congressional energy study which they hope will lead to a national fuels policy with end use curbs on natural gas.

The Senate-House Economic Committee's subcommittee on energy and automation, under Rep. Wright Patman (D., Texas), has opened a staff probe into state as well as federal regulation of fuels and energy.

First step was to distribute a questionnaire to all federal agencies (Federal Power Commission, Interior Department, Atomic Energy Commission, Office of Civil and Defense Mobilization) and to state agencies. Officials are to supply information on: The basis for each respondent's regulation of fuels or energy; a history of its relationship with resources; objectives of the programs of each agency; a summary of rules or policies; duplications of authority and the extent of coordination, and recommendations for improving the federal role.

The inquiry is focused on the "long-run adequacy of energy resources and development of energy technology as related to economic stability and growth," the chairman says. The probe is designed to spotlight the "variety and extent of the present complex of relationships between owners, producers, distributors, and the several levels and instrumentalities of government" in the energy and fuels field.

The coal boys also won in their bid for congressional approval of a $2 million a year research program by the Interior Department. Under this program, the government will conduct studies into methods of improving coal production, marketing, use, and promotion, and turn the results over to the industry.

Conservative congressmen, reading the black handwriting on the mine wall in the coal industry move, successfully blocked its bid for a full-blown fuels policy study by a special 16-man Senate-House Committee. The House Rules Committee several times refused in close votes to permit the resolution creating the study to go to the House floor for a vote.

Among the congressmen fighting the resolution was Rep. Oren Harris (D., Ark.), chairman of the powerful House Commerce Committee and sponsor of the ill-fated natural gas bill. Rep. Harris pointed out to the rules group that his committee already has the staff, the experience, and the authority to conduct such a fuels study.

He pointed out that no industry, including the coal-boys now begging for the joint committee study,

Length after length . . . Mile after mile . . . Every inch of

BUSADA BUTYRATE (PLASTICS) GAS PIPING IS IDENTICAL!

IT'S CLEAR! YOU CAN SEE IT'S BY Busada

It is transparent . . . made from one specific material formulation containing the same physical properties shipment upon shipment. Its high quality is constant. Made to same O.D. as steel pipe with 2 wall thicknesses. Close tolerances insure leakproof, trouble-proof ease of installation. Complete line of fittings.

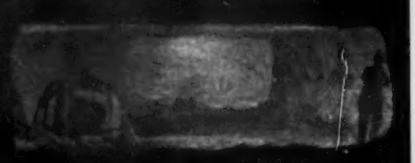
Butyrate pipe now available in black

Made by Busada Mfg. Corp., for

BUSADA SUPPLY CO. INC. 32-21 DOWNING STREET FLUSHING 54, NEW YORK

Representatives in: Boston, Los Angeles, Shreveport, La., Kingsport, Tenn., Grand Rapids, Mich.

UNDERGROUND STORAGE FOR LPG



ENGINEERS
CONTRACTORS

FENIX & SCISSON, INC.

5805 E. 15th • TULSA 12, OKLAHOMA

record-breaking tunnel job *fully protected*

For lifelong dependability in a vital power generating installation, these 13-foot diameter penstocks were lined, coated and wrapped by Hill-Hubbell corrosion protection experts.

Whether yours is a large or small diameter installation, the best possible protection you can specify is Hill-Hubbell, the name synonymous with quality in mill coated-and-wrapped pipe.

Specify Hill-Hubbell wrapped pipe on your next job . . .

HILL·HUBBELL

DIVISION OF GENERAL PACIFIC CORP.

3091 MAYFIELD RD. · CLEVELAND 18, OHIO · YELLOWSTONE 2-7535

WARRENGAS
the Concentrated Fuel

GULF GULFTANE LP-GAS

WARREN
PETROLEUM CORPORATION
LIQUEFIED PETROLEUM GAS DIVISION
TULSA, OKLAHOMA

SALES OFFICES:
FORT WORTH, TEXAS
HOUSTON, TEXAS
LOUISVILLE, KENTUCKY
MIDLAND, TEXAS
JACKSON, MISSISSIPPI
ST. LOUIS, MISSOURI
NEW YORK, NEW YORK
OMAHA, NEBRASKA
COLUMBIA, SOUTH CAROLINA
TAMPA, FLORIDA
LOS ANGELES, CALIFORNIA
BRYN MAWR, PENNSYLVANIA

Faster LOCATING!
LOWER SERVICE COSTS
with the improved AQUA VALVE BOX LOCATOR!

Your Name In Gold FREE!

$32.50 F.O.B Cin., Ohio

STOCK this useful tool for every service CAR and CALL •

Speed Locating • Keep Customers Happy

- NO WIRES, BATTERIES or SWITCHES—simple, powerful magnetic action, factory adjusted to YOUR geographical location assures unfailing results!
- NO NEEDLE SPINNING—exclusive electric braking action saves you time!
- NO STOOPING—easy top-view reading!
- RUGGED—compact, accurate, convenient!
- GUARANTEED—to function regardless of weather, surface or ground cover!
- NATION'S MOST WIDELY USED LOCATOR!
- 15-DAY FREE TRIAL—No money! No obligation! You be the judge!

ORDER NOW-Wire or Call KIrby 1-4200 collect

AQUA SURVEY & INSTRUMENT CO.
824-D North Bend Rd., Cincinnati 24, Ohio

has asked that his group conduct the investigation. He said his group would conduct it, if asked.

POWER of federal courts to range freely in settling natural gas disputes has been reinforced.

The U. S. Supreme Court has ruled unanimously that federal courts do have the power to interpret natural gas supply contracts. The only limitation is that they do not delve into narrow technical issues where the Federal Power Commission has "special competence."

At the same time, the high court agreed next year to decide if state courts have the power to modify producer rates that have been accepted, even tentatively, by the FPC.

In ruling that federal courts may interpret gas supply contracts, the Court rejected a request from the government that it firmly establish the principle that interpretation of rate contracts is exclusively the job of the FPC. This opens the door for more court challenges of FPC contract rulings (some 10,000 such contracts have been filed with the Commission, each potentially at issue).

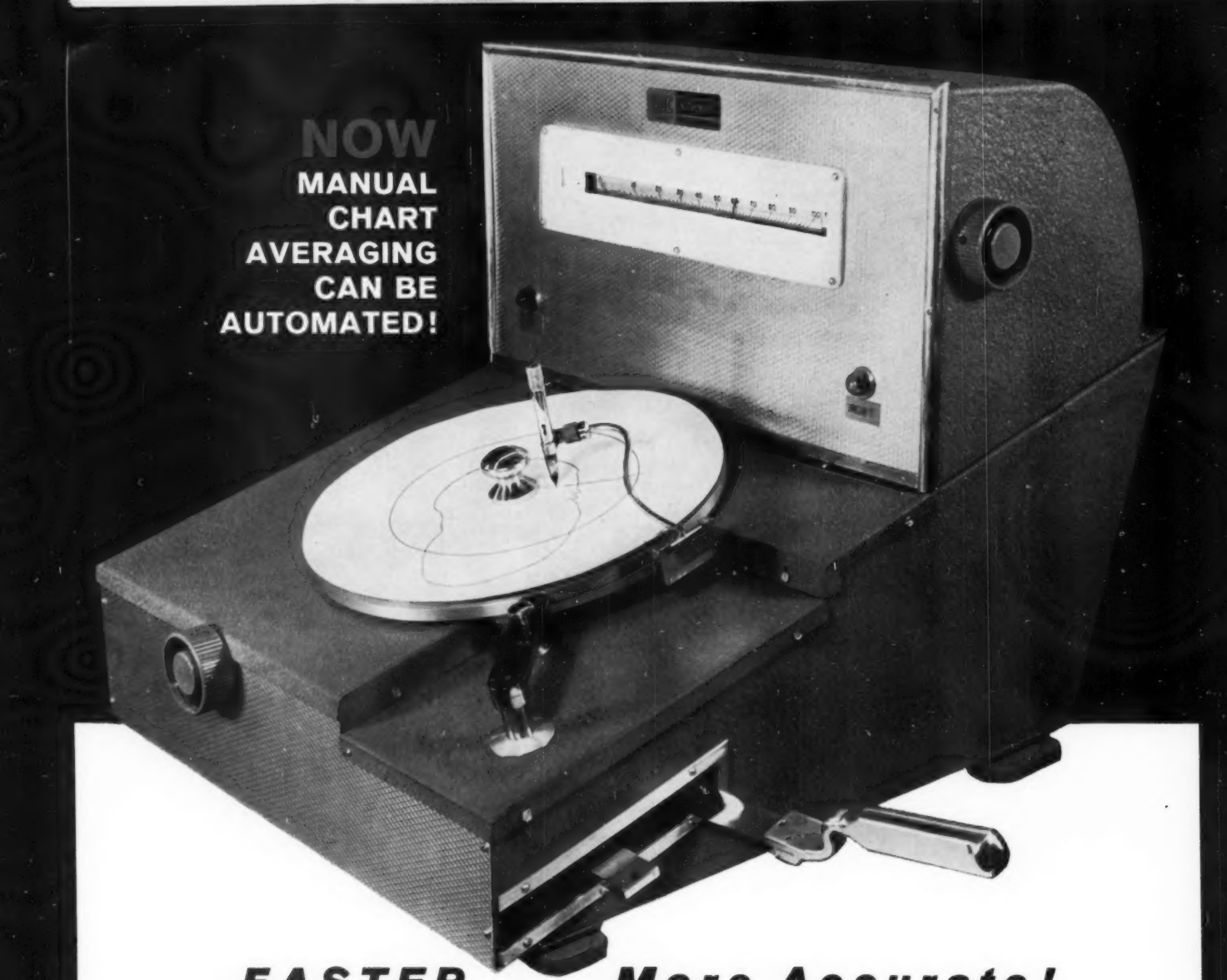
On its final decision day of the year, the high court in a close decision ruled in two cases that the Federal Power Commission may issue an indefinite sales certificate. Once a certificate is issued, the Court ruled, the producer is required to make sales until securing positive FPC permission to abandon sales, even though the term of the contract has expired.

The Court issued the "dedication of reserves" ruling in cases involving Sunray Mid-Continent Oil Co. and Sun Oil Co. in a 5-4 decision. The majority held that the Natural Gas Act regulates the abandonment by producers, permitting the FPC to authorize abandonment only if the reserves are depleted to the point where continued service is unwarranted or is no longer in the public convenience.

If a producer could seek certification only for the length of its supply contract, it could discontinue service at will, the pipeline would have to look elsewhere, and the "consumer would ultimately pay the bill," the majority said. This would put the pipeline "at the mercy" of the producer, it added. ■

GAS

PIPELINE SECTION



FASTER . . . More Accurate!

The UGC CHART AVERAGER continuously averages temperature, gravity or pressure charts. ONE OPERATOR in ONE OPERATION handles the job without comptometers, adding machines or the need for checking. No special operating skill is required other than a short period of instruction.

TIME SAVING—Typical time saving *per chart* is three minutes as compared with the time-consuming manual method.

ACCURACY—During a period of two months, more than 2,300 charts were manually calculated and AVERAGER figured. In every case the Averager produced correct averages as previously determined in the slower manual procedure.

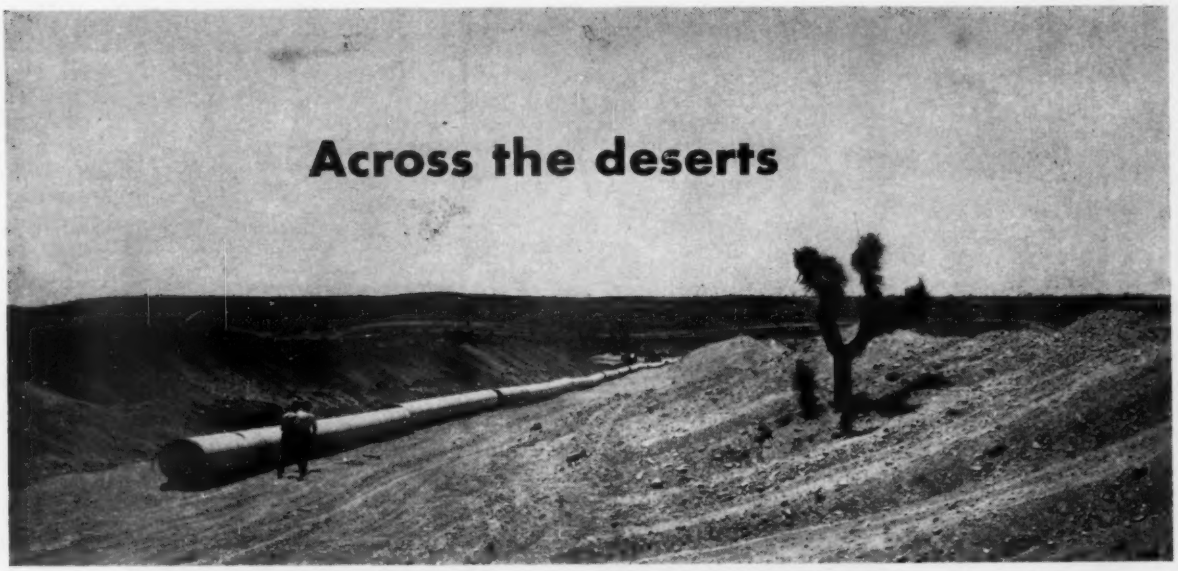
RELIABILITY—In 2½ years of research and testing, and with more than a year's actual operation in the United Gas chart offices, the all-mechanical AVERAGER system has been performance-proved for minimum repairs and maintenance.

MODELS AVAILABLE—Averagers are available for practically any circular chart—temperature, pressure, specific gravity, flow-rate or other process variables.

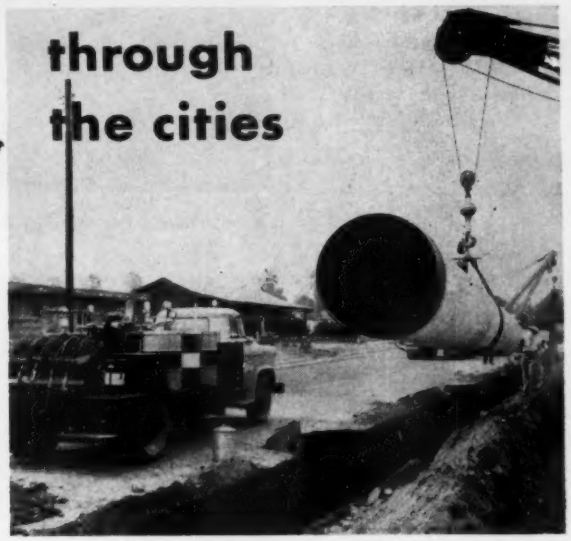
Strip chart models are available on special order.

For further information write or phone:
UGC INSTRUMENTS
P. O. Box 1407
Shreveport, Louisiana
Phone UN 1-4531—LD81

UGC INSTRUMENTS
A DIVISION OF UNITED GAS CORP.
CHART AVERAGER



over the mountains



Bellholed pipeline brings additional gas to southern California

This story is not a review of why more gas is needed in southern California. It is the story of how pipelines have been designed, engineered, and constructed to accomplish the objective.

By J. FRED EBDON • Editor

THE Pacific Lighting Corp. group of companies[1]—Southern California Gas Co., Southern Counties Gas Co., and Pacific Lighting Gas Supply Co.—is the largest gas distributor. They presently serve over 8 million people through 2.5 million gas meters. This is something like 800,000 meters more than Pacific Gas & Electric Co., number two in the "biggest list," and about 1 million more than Columbia Gas System, which comes next.

Actually, SoCal, SoCounties and PLGS form an integrated gas system. Both Cal and Counties own and operate some major pipeline facilities within the confines of California. PLGS is basically a gas storage

[1] See "The Pacific Lighting Story," by J. Fred Ebdon, GAS, Aug. '58, p. 49 and 105.

PLGS' 116-mile line was first leg of construction to effect delivery of Transwestern gas.

and transmission firm. Gas procurement functions have been centralized in the Gas Supply Co.

The 8 million people in Pacific Lighting's southern California service area will, according to the best studies available, almost double by 1975. And there are other important factors that urge the operating companies to seek and deliver new gas supplies almost continuously. In passing, it should be noted that these companies also supply the natural gas requirements for San Diego Gas & Electric Co. and furnish part of the gas supply to the City of Long Beach municipal gas system, at wholesale.

One step in bringing new, additional gas supplies into the Los Angeles Basin is the Transwestern Pipeline Co.'s[2] Texas-to-California transmission system. This project boomed in ahead of construction schedule and was due to start delivering by Aug. 1 initial quantities of the contract volume (300 MMcfd). PLGS has contracted for an early increase in this Transwestern volume to 350 MMcfd. Other increases are expected to follow.

Readers of GAS will know, however, that the Transwestern pipeline stops at the Colorado river—the state line between Arizona and California. Pacific Lighting Corp. operating subsidiaries have built the in-California projects that bring this new energy to populated areas in southern California.

[2] See "Transwestern Builds an 'Advanced Inch'," by J. Fred Ebdon, GAS, May '60, p. 57 and 117.

The first leg of construction to effect delivery of Transwestern gas was made by Pacific Lighting Gas Supply Co. This involved 116 miles from and across the Colorado river to an almost nonexistent desert community, Newberry, Calif. Under joint ownership of Southern California Gas Co. and Southern Counties Gas Co., another project to bring gas from Newberry into Los Angeles has been completed.

The Cal-Counties pipeline might best be thought of as two projects, while it actually was one project with two construction sections. The first section was 85 miles from Newberry to Cucamonga, Calif., of Jack Benny fame. The second was 32 miles from Cucamonga to Placentia, Calif. Southern California Gas Co. was in charge of construction of these sections. The pipeline will be jointly operated.

The Newberry-Cucamonga section is basically open country pipelining. The Cucamonga-Placentia is, on the other hand, basically urban-area pipelining that might be considered distribution-type construction.

The 116-mile PLGS project was made with 34-in. OD line pipe, terminating at a meter station near Newberry. The 117-mile SoCal-SoCounties project used 36-in. OD pipe.

If the second major additional gas supply project now contemplated is constructed, it will bring gas produced in the Panhandle, San Juan Basin, Rocky Mountain and Western Canada areas to Newberry in new pipelines. The 36-in. Cal-Counties segment of the

current project will, with some additional facilities, bring it, too, into the Los Angeles Basin. This gas will be carried to the California-Nevada border in an El Paso Natural Gas pipeline to be built from Thistle, Utah, to California, southwest of Las Vegas. Pacific Lighting Corp. operating companies will build the new line needed to move this supply from the border to Newberry. However, this whole development, the so-called Rock Springs project, is in the proposed stage and must await proper certification from regulatory bodies.

THE PLGS PROJECT

• Route

MOST of the pipeline that is bringing Transwestern gas in is strictly desert work. The PLGS 34-incher starts near the Fort Mojave Indian Reservation. It heads west across the Colorado and across the Sacramento Wash to slide between the Sacramento and Dead mountains. It traverses Piute valley and makes a passage through the Providence mountains to work around the southern reaches of the Devils Playground sand dunes.

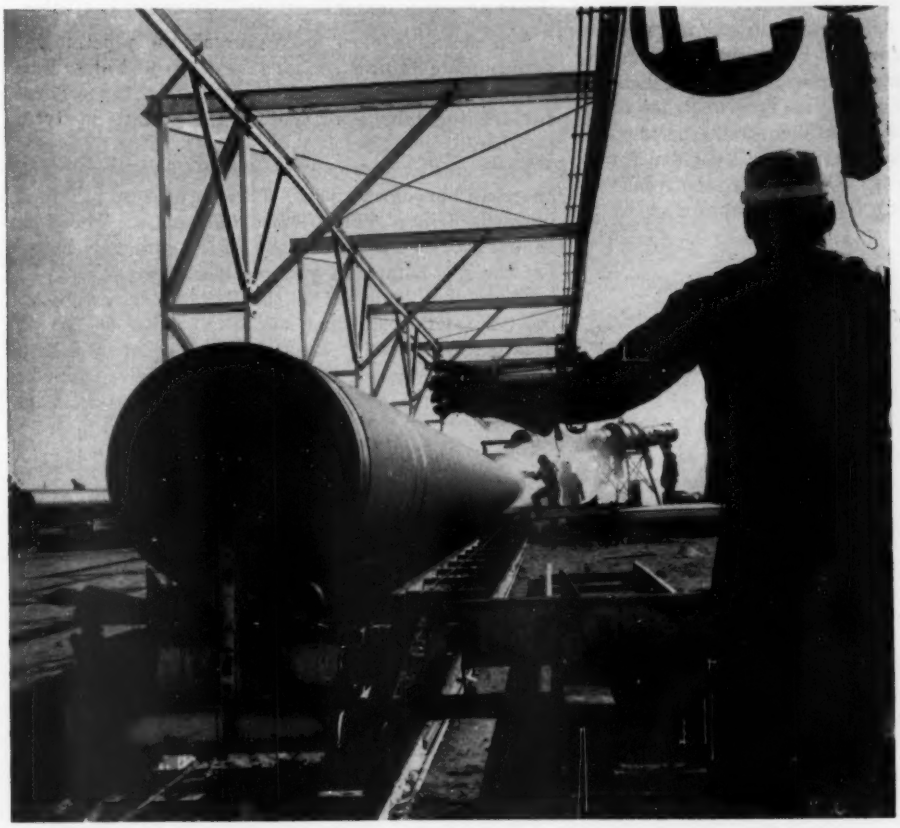
From there, it forces Bristol mountains, passes south of Tonopah dry lake, and skirts famed U. S. Highway 66, then crosses it, to more or less parallel it into the Newberry meter station. Except for about 10 miles in rolling hills, the route is flat terrain.

• Surveying

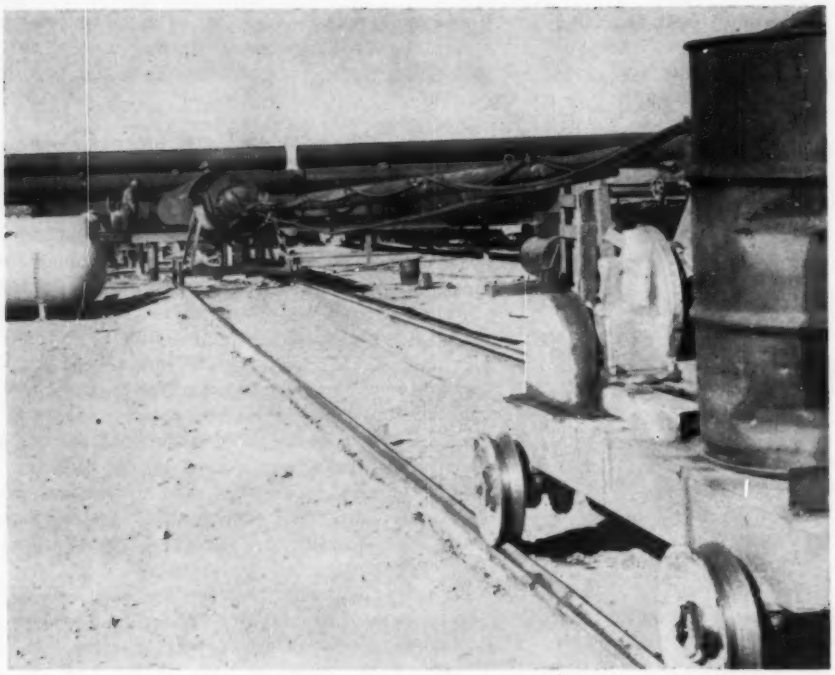
The survey started a long procession of new pipelining techniques. This was the first pipeline route survey by PLGS to make use of a Tellurometer surveying instrument.[3] This instrument, owned by Aerial Control, Inc., Woodland Hills, Calif., enabled the survey to be made quickly and accurately. Its best advantages were long sight distances on the desert route (it can make measurements at distances up to 40 miles with one set up); line-of-sight is not needed and fog, haze and heat "waves" do not affect it; and there is no need to occupy the line being measured except at ends. The latter was particularly important on the PLGS desert pipeline as it traversed an old military firing range and no one knew if dud projectiles, practice land mines, etc., were still around, and there was no time to systematically clear the strip of these possible hazards prior to the survey.

The basic control survey for the entire project was completed in three days of Tellurometer work, with a three-man crew. A pipeline traverse, which included measurement of both angles and distances, took a six-man crew three weeks of field work.

[3] See "Surveying Pipeline Routes by Radar," by M. E. Fuller, GAS, July '59, p. 118.



PLGS feels a real quality coating and wrapping job is produced by stationary equipment, such as this installation at Minneola.



Rail-traveling dolly inserts boom - mounted internal pneumatic line-up clamp into throat of 34-in. pipe at Minneola double-jointing yard. Root bead was manually placed before rolling 80-ft joint to automatic welder.

The most exciting facet of construction was the use of the bellhole method for cross-country pipelining. Bid specifications were written for both bellhole and over-the-trench methods, giving contractors the option.

In the bidding, three contractors or contractors' groups came in with bids for both bellholing and over-the-trench work. Seven based their bids on the bellhole method only. The low bid was for construction using the bellhole technique. PLGS' contract specifications called for bellhole construction, but provided for short sections to be built by the over-the-trench method at the contractor's option if approved by PLGS' project supervisor.

• The Pipe

The pipe for the PLGS pipeline was made to comply with American Petroleum Institute 5LX-52 specifications. It was fabricated by Kaiser Steel Co. in its Napa, Calif., pipe mill. The schedule of pipe and walls was as follows:

Feet	*Size*	*Weight/ft*	*Wall Thickness*	*Tonnage*	*General Usage*
602,000	34-in.	167.87 lb	0.469 in.	50,530	Mainline
6,300	34-in.	202.13 lb	0.566 in.	635	Road crossings & block assembly

Pipe was ordered with a standard 30-deg bevel on one end and a special 0.1875-in. land on the other to facilitate yard welding for double jointing with automatic welding equipment.

Pipe for blowdown stacks and miscellaneous uses was specified as Grade B, Schedule 40, electric welded, fabricated according to API 5L specs.

For casing pipe, 40.00-in. OD x 0344-in. wall pipe was used with 34-in. carrier pipe at highway crossings. Railroad crossings called for 40.79-in. x 6.688-in. wall casing.

• Block valve assemblies and cleaning facilities

Ten mainline block valves break the pipeline into approximate 11-mile sections for controllability. Block valves are 34-in. Rockwell-Nordstrom "Hypresphere" full-opening lubricated type. They permit on-stream pigging.

Four gate valves are fixtures in the assembly yoke and twin blowdown stacks. These are 12-in. units supplied by Grove Valve & Regulator Co. The same supplier built the fabricated 34-in. gate valves used for the pig launchers and receivers.

There is a launcher at the Colorado river, both a receiver and a launcher at Block Valve 6—the approximate mid-point—and a receiver at the Newberry meter station. Tube Turns Inc. fabricated four special 7-ton pig diverters for these installations.

• Protective coatings

Since no gas cooling will be used on the Transwestern project and since the Pacific Lighting Gas Supply Co. line is in climes where it can operate at temperatures as high as 135 deg F, a 225-deg F softening-point, plasticized coal-tar based pipeline enamel was chosen.

For normal pipeline coating, the company used:

One coat of coal-tar primer (Koppers 70B).

Coal tar enamel with a minimum thickness of 3/32 in., and average thickness of 4/32 in. (Koppers HiMelt Bitumastic).

An inner wrap of 0.015-in. thickness glass wrapper.

One outer wrap of 15-lb asbestos felt bonded to the enamel.

Thirty-four inch line pipe was coated at two yards —Minneola, Calif. and Henderson, Nev. (Pipe was also double jointed at these sites.)

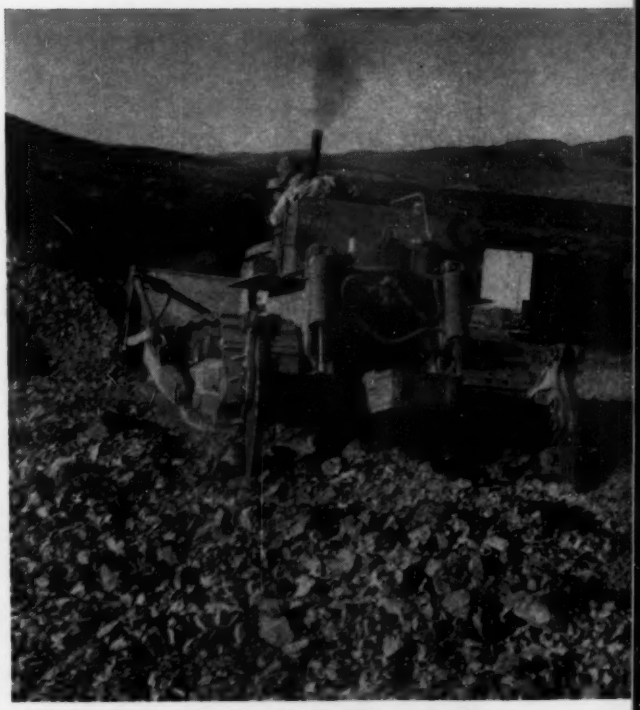
The coating process was unique in that hot coatings were delivered to the coating and wrapping yards by bulk tanker. The rigs used were insulated truck tankers and trailers capable of delivering 52 tons of hot enamel per trip.

Molten enamel was picked up from Koppers' plant in Fontana, and trucked to Minneola, at first, and then to Henderson. Fontana to Henderson means an 8 to 8½ hour trip covering some 240 miles. The trips to the other site were shorter. To Henderson, for example, enamel would cool from 550 deg F to between 410 and 450 deg F. Early experience indicated that solid enamel was depositing on the interior of tanks. Then, agitators were installed that kept the filler suspended and circulated hot enamel so that it would not cool against the tank surface. PLGS engineers figure that the 240-mile trip represents just about the maximum range for trucking hot enamel without adding heat to the load enroute.

The pipe coating was whitewashed to keep the pipe temperature relatively close during installation to the expected operating temperatures even in the striking desert heats. Studies indicated that a whitewash coat kept plate temperature very near ambient temperature. Uncoated pipe, and coated and wrapped pipe, sans whitewash, soared more than 30 deg F higher than ambient during the peak heats of the day.

Irregular surfaces — valves, fittings, etc. — were coated with the coal tar enamel or permitted to be coated with Pittsburgh Coke & Chemical Co.'s Tarset cold applied epoxy coal-tar pitch compound, if the contractor elected.

Casing pipe was coated with Carl H. Biggs Co.'s No. 695 epoxy resin with a minimum thickness of 1/32 in. Field joints in casing coating at welds were protected with two thicknesses of Seamless Rubber Co.'s Safe-T-Clad polyethylene tape.



Not all trenching in the Mojave desert was in sand. Here a tractor pours on power as rippers break up rock overburden.

The periphery of flanges at insulating joints was taped with electrical sealing tape. Those insulating joints installed above grade line had the area between flange faces filled with Royston Laboratories Inc. Roskote 612 XM mastic, and were then taped up.

Actually, Maury (Maurice E.) Fuller, Pacific Lighting Gas Supply's studious, personable chief engineer, sees the quality of the coating resulting from a bellhole pipeline project as the largest single advantage to the method. He feels that you get a better C & W application because: "With a yard set-up, the pipe is

Truck driver checks out his rig before hauling three 80-ft joints from double-jointing yard to ROW for stringing.

PLGS said this operation produces quality in a pipeline. Here, three welders run root bead in bellhole to the right. No. 4 pipe-layer (right) cradles behind weld. No. 3 pipe-layer (left) holds joint being welded. Clamps were released only after root bead was 100 per cent complete. No movement of the pipe was permitted until root bead and first hot pass was complete.

grit blasted and, if necessary for a good dry surface, the pipe can be heated before blasting.

"With the pipe cleaned down to a clean grey metal surface, the primer will produce the best bond possible. In cold weather the pipe can be preheated prior to application of the enamel to assure a uniform coating thickness. It is also possible to pour a strip of enamel along the longitudinal seam and around the double-jointing circumferential seam so no strip of reduced coating thickness exists.

"Because of better control with stationary equipment, it is possible to keep the thickness of the coating within 10 mils of the specified average required over the entire pipe surface regardless of the weather conditions.

"Pipe damage is easy to control. Wherever the coating is gouged, easy-to-see evidence is provided the inspectors. It tends to make a contractor more aware of the need for careful pipe handling."

Naturally, more coating patch-work will be required from bellholing as the coating is damaged when the pipe is field bent and you have more field joints. But, they can be minimized by bending pipe at a temperature that renders the coatings pliable, and field joint coating techniques (floodcoaters, etc.) and materials on the market these days reduce labor and enamel formerly required for field joints. The yard coating and wrapping (and double jointing) for PLGS pipe was done under contract by Pacific Pipeline Construction Co., Montebello, Calif.

• Double jointing

In the double-jointing yards at Minneola and Henderson, Pacific Pipeline used automatic welding heads (Lincoln) to run on an inner submerged arc pass and then an outside pass, after line up and being manually tack welded.

Internal line-up clamps were boom-extended from a rail-traveling dolly. Propane-fueled burner heads were used for preheating the pipe prior to welding in temperatures below 40 deg F. Then, specifications called for application of the root bead when the pipe had been uniformly heated, at the end circumference, to approximately 100 deg F.

The automatic welding heads were protected in a corrugated transite doghouse with a canvas drop-front, to shield them from wind, blown dust, etc. If desired, it was easy to obtain 100 per cent X-ray inspection of the yard-made joints while the pipe was on racks.

It was quite a sight to see the 80-ft joints of coated and wrapped 34-in. OD pipe being loaded on long pole trucks for the trip to the ROW. Contractors Cargo Co. of Los Angeles was stringing the pipe, three joints to the truck, and averaging around 90 joints per day. The longest trip was about 120 miles from the Henderson yard. Hauling of double-jointed lengths of big-inch pipe might be a disadvantage of bellholing a pipeline in areas where highway authorities are touchy about load length and weight limitations. Also, twisting roads and/or particularly rugged country might add an almost impossible stringing problem to the economics. Again, Pacific Pipeline Construction had the contract for double jointing.

• Field construction

The river crossing

To get from Arizona into California, a pipeline just has to cross the Colorado river. Previously, all major transmission pipeline crossings of the Colorado have been overhead. But, PLGS elected to make a submerged crossing of this water for the first time and at a cost of an additional 20 per cent.

But this extra money is, PLGS believes, wisely spent. The following reasons apply:

(1) Continuity of service is better assured as there isn't too much in the way of damage that can be done to a properly installed under-the-river crossing.

(2) The two 24-in. OD runs being used in the PLGS Colorado crossing will give a greater capacity (640 MMcfd) than a single 30-in. overhead passage.

(3) There is less maintenance cost experienced with submarine crossings.

The twin 24-in. pipeline crossing submarined under the Colorado by PLGS is located about seven miles north of Needles, Calif., where the river normally courses about 458 ft between banks. Flood stage considerations, however, dictated a 1400-ft stretch before coming up to manifolds.

Initial plans called for the crossing to be made at Topock. But good crossing sites there are few and occupied. And lava beds coupled with plenty of plain rock make the cost of submerging near that city go right out of the ball park.

If a suitable site were available, an overhead suspension bridge at Topock would have a span of about 1000 ft. But at the present site, this would have to be extended another 500 ft. The 1500-ft span contemplated led PLGS to give serious consideration to the as-constructed submerged crossing.

Both 1400-ft, 24-in. crossing legs were pulled across and lowered-in with no trouble in about 1.5 hours each. The second, however, located about 500 yards upstream, ran into some quaking clay during the trenching and gave the contractor—Missouri Valley Dredging Co., Omaha—considerably more worry.

The crossing runs were made with 0.625-in. wall pipe, double coated and wrapped, and weighted to 360 lb/ft with reinforced concrete coating.

Out in the abject desert, temperature runs all over the place. It can freeze and it can elevate to well past 120 deg. PLGS designers figured the practical temperature range that will be experienced covers some 85 deg F, from 50 to 135 deg. Combine such a differential with an internal gas pressure of 1032 psig, and a 990,000-lb maximum longitudinal loading can be produced. Because the peak temperature differential will occur on a yearly cycle, pipeline enamel will be subject to "cold flow" during six months of each half of the cycle. Hence, it was assumed that none of the axial load would be transmitted through coatings to the soil.

They figured the pipeline would experience an alternating axial load in straight sections and a reversing bending moment in curved sections. So special steps were required to keep secondary stresses at a minimum.

To limit pipe movements, the contractor was required to keep the radius of overbends long enough so that the pipeline would behave as a column, or install anchors. Unanchored overbends were installed with a minimum radius of 1020 ft when the cover over the line was not less than 30 in. The contractor was permitted to shorten the radius of those where increased cover could be provided. Side-bends were limited to ½ deg per foot along the longitudinal axis. No special restrictions were placed on sag bends, other than those found in ASA B31.1, Section 8.

Trenching

While you expect to find lots of sand and clay in desert areas, and the contractors on the PLGS line did find that, there was considerable ripping in addition, and some drilling and shooting.

California's famous decomposed granite had to be broken with crawler tractors and ripper attachments. Reconsolidated lava and other igneous layers had to be treated similarly. Hard lava—over 8000 ft of it—had to be drilled and blasted.

Normally, the trench was dug to provide not less than 30-in. cover over the 34-in. OD pipe with 4 in. of padding under it. This cover was increased to a minimum of 60 in. at the Sacramento Wash, and reduced to 24 in. in blasted rock, provided overbends were not needed.

The trench had to be cut to permit the very maximum use of cold bends rather than the use of segments or weld ells. This resulted in some pretty deep trenching in the hill country.

Minimum width for the trench was 46 in. Pipe walls had to clear the sides of the trench by not less than 3 in.

Some runs could be trenched with a Cleveland 320 trenching machine with no trouble. On another section, six or eight backhoes had to be brought into action.

Line-up and welding

On a bellhole job, for lowering-in, lining up and welding, fewer and lighter tractors can be used. On the other hand, you must have at least two back-

hoes or clams (depending on the soil) to dig the 80-ft apart bellholes. But, such equipment is cheaper than the much heavier and more numerous tractors that are needed for over-the-ditch construction. PLGS' Maury Fuller reports on the set-up used by the contractor—a joint venture between Engineers Limited Pipeline Co. (El Cerrito, Calif.) and Pacific Pipeline Construction Co. (Montebello, Calif.).

"The contractor devised a unique procedure to line-up and weld the pipe in compliance with specifications. His equipment consists of four sideboom tractors (*Cat 572 Pipelayers—Ed.*) and a tractor on which four welding generators are mounted (*a Cat D-7 powering 2 Lincoln Twin-Arc welders—Ed.*). While the root bead is welded, the following functions are performed by the tractors:

"The lead sideboom picks up and holds a single 80-ft joint at the midpoint, in position ready for line-up upon completion of the first hot-pass weld on the previous joint.

"The second tractor is ready to support the leading end of the joint being welded, but no lift is made until the hot pass is completed on the previous joint.

"The third tractor is supporting, at the midpoint, the joint of pipe being welded.

"The fourth tractor is supporting the end of the joint being welded, at a point immediately behind the weld.

"As soon as the root bead is applied, the internal line-up clamp is released. The third and fourth tractors move ahead while the welders remain in position and apply the first hot pass. These tractors then become the first and second tractors, respectively, doing the work described previously.

"As soon as the first hot pass is completed, the welders move forward and apply the stringer bead to the joint between tractors 1 and 2. While the stringer bead is applied, tractors 3 and 4, respectively, move to the lead ready for welding to start on the next joint, completing the cycle."

These points are significant in the welding specifications. First, the internal line-up clamps could not be released until the root bead is 100 per cent complete.

Both sides of the contractor-dreamed-up pipe shader are shown here. Trencher dug borrow ditch to deliver material to long conveyor which lifted it to shaker-sifter that sorted and poured selected shading into pipe trench.

Second, after a root bead is started, the welders had to work away on it until the root bead was completed, using not less than three welders. Third, immediately after completion of the root bead, the first hot pass was started, and this pass had to be completed before any movement of the pipe was permitted.

In reviewing these welding requirements in the field, Chief Engineer Maury Fuller said, with complete agreement from Vice President and Executive Engineer Ray Todd: "This is where your quality pipeline is made."

The firing line welders then followed closely with 5 two-welder crews. The capping had to be done with at least two welders per crew, operating simultaneously on opposite halves of the pipe's circumference. This provided symmetrical distribution of the thermal stresses.

With lowering-in done along with welding, it is obvious that the pipeline went in without the skid-damage to coatings known to happen during over-the-trench construction due to atmospheric temperature variations. On PLGS' line, the contractor could weld in a continuous string as long as the ambient temperature stayed between 50 deg and 90 deg F. When the plate temperature taken internally on the sun-exposed side and 180 deg from that side, and averaged, gave a value of more than 90 deg F, the contractor had to leave breaks. Breaks were then tied in when the temperature was in the 50- to 90-deg F range.

On hills or slopes grading greater than 20 deg, when the temperature was less than 70 deg F, PLGS had the pipe lowered-in from the top of the hill. For over 70-deg F work on the hills, PLGS had the pipe lowered into the trench from the bottom of the hill. However, the gas company did show some mercy and provided that the contractor did not have to pipeline in more than one direction on any single steep slope.

Backfilling

In addition to the 4-in. padding under the PLGS pipeline, the designers wanted not less than 6 in. of cover to shade the pipeline at periods when the air temperature was between 50 and 90 deg F. The shading material could have clods with a dimension of 2 in. or less.

The contractor built up an interesting rig for the shading operation. A Cleveland 240 trencher dug a 3-ft borrow trench parallel, and close, to the pipe trench. This delivered random material to the hopper of a long conveyor belt unit pulled by a Cat D-7. This lifted the material to a shaker-sifter. The shaker dropped the graded material on another conveyor and tossed the rejected rocks, etc., over the back. The second conveyor, working at a right angle from the long one, poured the fine material over the pipe to produce a shaded pipeline to specifications. The rejected and ejected material was then pushed back into the borrow trench.

Further backfilling made use of the spoil pile from the pipeline trench, with the contractor being responsible for eliminating hard material with a dimension of more than 12 in.

• Evaluation of the bellhole method

The pipe diameter is a critical factor in the decision that selects the method for constructing a pipeline. Most experts agree that a 24-in. OD pipeline would, if bellholed in, cost more than an over-the-trench job. Too, the cost of bellholes in extremely rocky areas would be prohibitive as would such a job in country with a high ground-water table and lots of rain. We have mentioned what highway load regulations, twisting and steep roads, etc. can do to any double-jointed project.

But, Pacific Lighting Gas Supply Co. sees a lot of advantages to its bellhole project. First, it had expected a 4 per cent higher cost than if it had gone down the over-the-trench road. Actually, the cheapest bid was for bellholing. However, the average bellhole bid received was 0.70 per cent higher than for over-the-trench.

First, as previously mentioned, the prime advantage PLGS sees is the higher quality of the protective coating resulting from the bellhole construction technique. Then, double jointing in a yard normally produces better quality welding than that produced in the field on the ROW.

When bellholing, the pipe fits the trench better. Thus, secondary stresses that are impossible to analyze are at least kept to the minimum possible value.

Less manpower is required. PLGS figures about 200 to 225 men are needed for a bellhole spread. Another 50 or so men will be used in the double jointing and coating yards. Over-the-trench spreads working 34-in. stuff will require from 325 to 375 men.

While bellholing, much of the work is done in the trench. Hence, welders have their arcs and beads protected from high heat transfer rates. In short, you don't have to shut down so much when the wind blows.

Based on previous bellhole pipeline construction experience, Pacific Lighting Gas Supply Co. is well pleased with this method of construction. PLGS feels that a really top quality pipeline can be built in this manner. In Mr. Fuller's words: "It provides a means, in our opinion, of meeting realistically the welding problems described in the American Gas Association Research Project NG-10, *The Effects of Welding Procedures on Base-Metal Cracking Adjacent to Girth Welds and Welded Connections in Natural Gas Pipe Lines*, and at no premium in cost."

Further, ". . . experience indicates that where the method is applicable, 30-in., 34-in., or larger diameter pipelines can be constructed at lower cost by the bellhole method than over-the-trench. As diameters increase in the future (*42-in. OD line pipe has already been rolled—Ed.*), it is my opinion that this trend will continue."

• Tipping our hat

Field engineering, supervision and inspection was handled by Pacific Lighting Gas Supply's own people. Project engineer was Frank Whipple. Marcus "Buck" Buckland was project supervisor.

The Cal-Counties story begins on the next page.

Through unpopulated deserts and busy city streets—a study in contrasts

Part 2. SoCal—SoCounties build a 36-incher

THE new pipeline built by SoCal and SoCounties, tenants in common and along with PLGS operating subsidiaries of Pacific Lighting Corp., is also a desert pipeline for the most part. And it is a big one.

It starts at Newberry near a site for a compressor station. At the moment, there is no need for the station and it is not under construction. The building of it depends on the increased deliveries Transwestern is able to undertake and the development of the proposed Rock Springs project.

• Route

The Cal-Counties project is a 36-in. OD pipeline. As it heads for Los Angeles it skirts Rodman and Ord mountains to go across a desert floor past Lake Lucerne (Calif.) and Granite mountains before going through Lucerne Valley. Apple Valley is bypassed to the south and the usually dry Mojave river is traversed. From there, the pipeline joins Highway 66 and railroads by crossing the San Gabriel mountains via the well-known Cajon Pass. The peak elevation of the construction was experienced at Summit in Cajon Pass—3822 ft.

Coming out of the pass the steel conduit dodges San Bernardino, runs past Fontana, and reaches Cucamonga. That is the practical end of desert pipelining on the route. It is also the end of open-country, cross-country construction.

From Cucamonga on its travels via Upland, Ontario, Pomona, Chino, through Carbon Canyon in the Chino Hills and into Placentia. The construction was comparable to running a 36-in. pipeline down Main Street, U. S. A. It was strictly city-type country with all of the problems and impediments thereof.

For construction purposes, the line involved two sets of specifications. The first was for the open country type of pipelining involving about 85 miles of 36-in. OD steel pipeline from Newberry to Cuca-

monga. The other, the city stretch, was for 32 miles of 36-in. OD pipeline from Cucamonga.

Both sections were built by the bellhole method. That is about the only way the Cucamonga-to-Placentia portion could have been built. The open-country contractor also chose this method.

The contractors who did the work are Young & Anderson Co., Brea, Calif., from Newberry to Cucamonga. A combine of Hood Construction Co., Whittier, Calif.; J. P. Neill & Co., Dallas; and River Construction Corp., Ft. Worth, (a subsidiary of Morrison-Knudsen, Los Angeles), did the work from Cucamonga on in to Placentia.

• The pipe

Seven wall thicknesses of 36-in. line pipe were used on the "Cajon Pass Project," as the pipeline has become known. Pipe was rolled by Consolidated Western Steel Division of United States Steel Corp., at its Provo, Utah mill. It is API 5LX-52 line pipe, and was delivered in average 39-ft lengths.

The pipe walls and weights are as follows:

Size	*Wall Thickness*	*Weight/ft*
36-in.	0.391 in.	148.56 lb
36-in.	0.406 in.	154.43 lb
36-in.	0.423 in.	160.30 lb
36-in.	0.453 in.	172.03 lb
36-in.	0.484 in.	183.73 lb
36-in.	0.500 in.	189.57 lb
36-in.	0.594 in.	224.61 lb

The several changes in pipe wall are due to the designers taking the weight of gas into consideration —reduce wall thicknesses at elevations and increase where low spots would apply a "column" of gas on the wall. Then, other walls were needed for both highway and railroad crossings, river crossings, both supported and unsupported spans, different classes of construction as defined in ASA B31.1.8, and anticipated changes in classification of construction due to rather booming building conditions experienced around some desert communities.

Bare casing, in 10-ft unbevelled end joints, was used in the following walls:

Size	*Wall Thickness*
42-in.	0.375 in.
42-in.	0.625 in.
42-in.	0.688 in.

This pipe was rolled and furnished by Kaiser Steel Corp.'s Fontana mill.

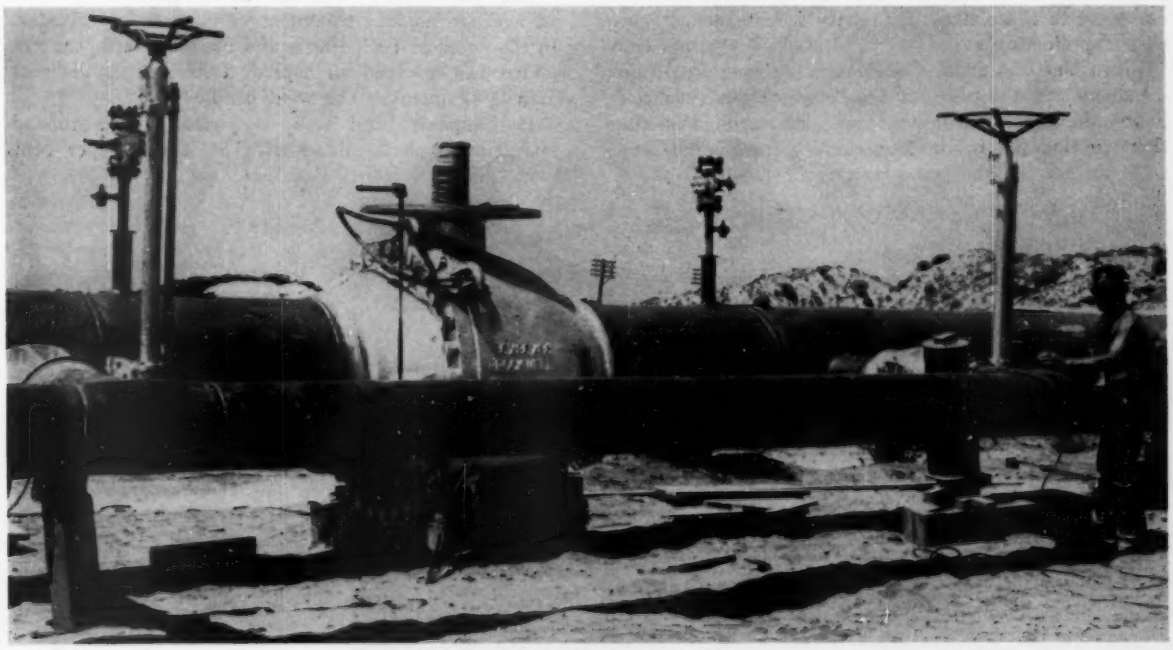
• Block valves

Fourteen mainline block valves were set. The assemblies used 36-in. Rockwell-Nordstrom hypresphere lubricated spherical pipeline valves. Yokes were 12-in. nominal diameter piping with lubricated plug valves supplied by the same manufacturer.

The assemblies were made up by the contractors from valves, extended cylinder mountings, cylinders, operators and water-tight worm-shaft extensions furnished by the gas companies. SoCal and SoCounties installed all instrumentation and valve control piping.

• Pressure limiting stations

Two pressure limiting stations were designed into the pipeline. The designed pressure inletting from the Newberry meter station is 840 psig. The first pres-



Block valve assembly being fabricated in the field near the summit of Cajon Pass. A big 36-in., full-opening, 400 psig class ball valve is the mainline unit.

When bellholing, all you need for the lowering-in pipe, and hot pass welding gangs is four pipelayers and a welding generator. Here, these units work along in the desert.

sure limiting station is located at Fontana (Block Valve #16) and controls the downstream pressure to a value less than 721 psig. The other PLS is set at Yorba Linda (near Placentia) and controls downstream pressure to less than 466 psig.

The regulating equipment is lubricated plug valves with Ledeen Mfg. Co. actuators and control systems.

• Protective coatings

The "cross country" section of the new line was coated and wrapped (and double jointed) on the same pattern as described in Pacific Lighting Gas Supply Co.'s construction review. Yards were set up by Young & Anderson at Yermo, Thorn and Muskat Siding—small desert communities. Bulk coating materials were delivered to these sites in tankers for stationary machine application.

Since the line from Cucamonga on was in urban developments, the pipe for the "city section" was not double jointed. Coating was done by Pacific Pipeline Construction Co. in its Montebello yard.

The coating specifications called for:

Single Wrap

One coat of asphalt primer.
One coat of filled asphalt, averaging 4/32 in. or greater.
One spiral wrap of asbestos felt.

Double Wrap

One coat of asphalt primer.
One coat of filled asphalt.
One spiral wrap of glass mat.
One spiral wrap of asbestos felt.
One coat of filled asphalt.
One spiral wrap of kraft paper.

The double-wrap coating was designed to produce an average asphalt thickness of 5/32 in. or greater. In the cases of both single and double wraps, the gas companies specified an asphalt thickness of not less than 2/32 in. over the weld bead.

The asphalt used was composed of air refined petroleum asphalt mixed with at least 10 per cent

On the Cal-Counties pipeline it was easy to trench in some areas, but pretty rough in most. This view shows easy trenching country with bellholes dug.

(by weight) of marter white, regular grade. It had a flash point of 475 deg F or higher by the Cleveland Open Cup, ASTM D92-52, method. Penetration was determined by ASTM D5-52, except that a blunt needle was used, and had to show a maximum of 12 and a minimum of 8 at 300 gm., 77 deg F, for 10 minutes.

Fifteen-pound asphalt saturated and glass reinforced asbestos pipeline felt was supplied by Johns-Manville Corp. and Philip Carey Mfg. Co. Glass mat was supplied by Owens-Corning Fiberglas Corp. ("Coromat") and Johns-Manville ("Blue Flag").

The coating and wrapping was inspected with Tinker & Rasor Model H2 holiday detectors set for a crest electrode-to-pipe voltage of at least 13,000 volts on the single wrap. Crest voltage on the double wrapped pipe was set for a minimum of 16,000 volts.

All field joints were double coated. Valves were primed and coated with asphalt enamel by brush to a thickness of 5/32 in., if they were installed underground. Underground fittings and bare pipe of all sizes were given the double coat treatment.

Aboveground bare pipe, valves, fittings, etc., were primed and painted with two coats of birch-colored paint if on the open-country section. In the urban section, this equipment was primed and painted with two coats of aluminum paint.

Insulated joints that were installed in vaults or buried in the ground were primed with a thin coat of asphalt primer. Then, plastic tape was used to cover outside edges of the flanges by a double layer, with the first layer covering the gap between companion flanges. Royston Laboratories' Roskote was next thickly coated over edges of tape, backs of flanges, nuts and bolts, and insulating and steel washers. The Roskote was allowed to dry. This was followed by a second double-layer wrap of plastic tape. Two more coats of Roskote went on over this and the whole thing was protected with felt wrap, strapped on with tape. Pipe next to flanges was double coated with the standard coating.

• Field construction

Since the bellhole construction technique has been generally described for the PLGS pipeline, it will not be repeated here. While all operations were not exactly alike on spreads that worked on the PLGS and SoCal-SoCounties sections, the basic ideas and methods were similar.

The Cajon Pass pipeline was built with three spreads. One started at Newberry on the open-country section and worked west. On the city section, one spread started in Placentia and worked east while another started in the Cucamonga area and worked west. The eastward working "city spread" had to coordinate its work to keep from conflicting with some major trunk sewer work planned by a sanitation district in its route.

From Newberry to Camp Rock road the Young and Anderson spread (open country) was in solid rock with plenty of ups and downs furnished by slopes and hills. One 32-deg grade was encountered that could be licked only by "yo-yoing" equipment. It took two days to make 10 joints on this hill.

Open country trenching

In the Kane Springs Canyon area care had to be taken when trenching to prevent damage to an existing 30-in. OD high-pressure gas pipeline. For blasting, the contractor was advised to use 72-in. deep holes drilled 6 in. inside the proposed ditch. Maximum separation was set at 4 ft, and the holes were drilled in zig-zag pattern.

Not more than 6 sticks or 2 lb of powder were permitted for charging each hole in Kane Springs. Short-period delay type detonation was used to keep a 3-millisecond interval between individual blasts, with not more than two charges being detonated at one time.

Where rock excavation by blasting was general and continuous, the minimum cover was reduced from 30 to 26 in. The trench was padded with fine material to produce a 4-in. cushion for the coated and wrapped pipe.

Eight inches of shading material was specified. Plugs—fill ins between bellholes—had to be backfilled within 12 hours after completion of the welding.

Welding

Welding on the SoCal-SoCounties line was a bit different from that on the PLGS project. With the external line-up clamp, partial beads were permitted on the Cajon Pass pipeline provided the partial stringer beads had a minimum length of 4 in. Once the root bead was started, the spacing (0.0625 to 0.125 in.) could not be readjusted by movement of the pipe.

No tack welding was permitted and all welding had to be done downhill.

After the root bead was completed and following repair of any defects in it, a hot pass bead followed immediately. The purpose there was to get the first hot pass on before the pipe temperature dropped below 200 deg F. This hot pass was a wash pass rather than a second stringer bead.

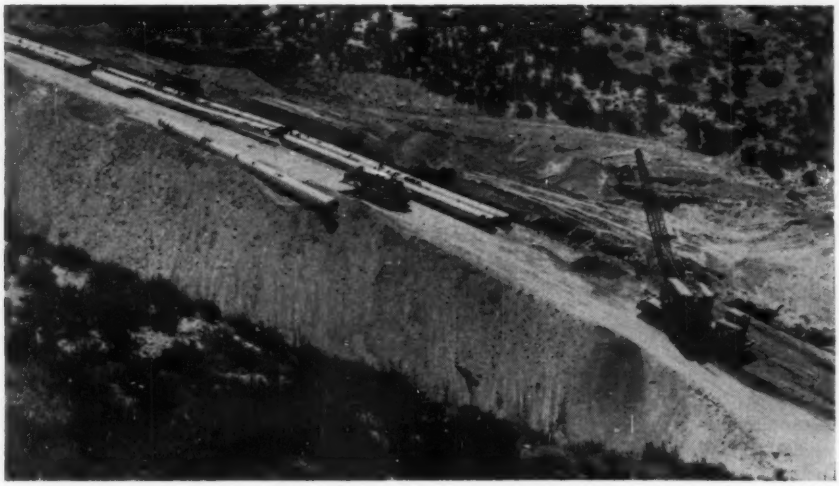
Yard-welded joints were 100 per cent radiographed. The same inspection density was used on welds in the field on valve assemblies, etc. In the desert or open country, about 15 per cent of the field joints were X-rayed. In the city, every field joint was so inspected. Central X-Ray Co., Dallas, had the contract for all radiographic inspection on the project.

Mojave River crossing

At about the line's midpoint the tube had to dip out of the lower slopes on the foothills of the Ord mountains to cross Mojave river (dry at this and most times of the year) and the low, flat desert of Antelope Valley. Pipe with 0.484-in. wall was used in this area for several thousand yards.

The wide flood plains of the river made a consequential excavation of sand-grain sized decomposed granite and alluviums. Due to the scour that can be produced by fast moving water rushing out of the mountains via this river, 12 ft of cover was asked for the crossing. This was, of course, all dragline work and, while it wasn't particularly hard digging, there was an awful lot of it.

Through Cajon Pass



Cajon Pass work

Coming through Cajon Pass the pipeliners got in a little mountain work. However, it was not the same as working in remote mountains. It was worse. In the first place, the pipeline and highways and the mainline of the Sante Fe Railroad go through the pass together. At several points the pipeline and the railroad are very close to each other. And, some of the construction was in San Bernardino National Forest during a very dry part of one of the driest seasons when fire danger was exceptionally high.

In the top of Cajon Pass rock was encountered. These were not little rocks but the big-as-a-house variety of boulders. Some blasting was necessary.

The National Forest work required a Special Use Permit from the United States Department of Agri-

culture, Forest Service. Such matters as orderliness, neatness, sanitation, and preservation of the scenic and aesthetic values of the area were stressed. But the most stringent provisions dealt with the prevention, control and suppression of forest fires on the ROW within the forest.

A fire warden designated by the district ranger had to be on the job site at all times. He was commissioned a State Fire Warden. He could take any steps necessary to protect the forest under any conditions up to and including shutting down the work or use of all the contractor's men and equipment to fight any fire on the grant or in the vicinity, regardless of cause. As are the expected results when such officials and pipeliners work together, they get to know each other well and the cooperation in Cajon Pass was excellent.

The contractor had spark arrestors on all engines and equipment, and each tractor carried a shovel, an axe, and at least a 4-lb fire extinguisher for fighting incipient blazes. Naturally, gasoline and other potentially destructive materials were given additional attention, although the contractor's safety effort throughout the project was outstanding. A 25-man fire tool cache, with tools specified by the district ranger, was maintained in a big red box where the spread was working. Special precautions were taken where blasting was necessary.

City work

Problems associated with the spreads doing the "city work" were confined working space, traffic, sightseers, and the usual foreign lines and substructures one expects to find in developed areas. While the spread in open country was able to average between 5000 and 6000 ft per day, spreads in the cities were held to about 1000 ft per day.

Contractors on the city section provided one man per spread for public relations work. He handled the problems that arose when one of the pipeliner's neighbors came in contact with the construction operations. By far the vast majority of these problems were anticipated and the public relations effort applied prior to the actual work.

Traffic control and public safety were critical in some of the city areas. However, on the most part, the streets the pipeline went down were quiet residential types that did not involve the more publicized extremes of California traffic. One street, Orangethorpe Ave., offered some dense traffic. It was kept open under control of a flagman for single-lane traffic during daylight hours and reverted to two lane uncontrolled traffic at night.

Casing technique

Casing found much use as the city section of the pipeline made crossings under streets, highways, railroads, and substructures. Casing used was 42-in. OD, in varying walls from 0.375 to 0.688 in. As the 36-in. carrier pipe was inserted into the 42-in. casing, internal casing spacers (wrap around type) were put on at less than 12-ft intervals. The annular space between circumferences of the casing and carrier pipe were closed with slip-on type Maloney casing seals.

Backfilling

Backfilling in the city was a little more stringent than for that operation in the open country. The objectives, while rather obvious, were: (1) provide a firm support for the lower half of the pipe without injuring the coating and wrapping in the process, (2) seal the bottom of the trench to prevent flow of ground water along the bottom of the trench, and (3) provide a compacted backfill over the pipe to support expected loading from pavement and traffic.

Except where the city section traversed the Chino Hills, backfilling specs called for about 10 in. of shading material above the pipe and jetting the material under the pipe to produce a firm bearing surface. Then, the trench was backfilled and consolidated and compacted by water or mechanical devices where the permit-issuing agency required it.

Bellholes and bore slots were consolidated up to the bottom of the pipe by mechanical compaction. Completion of backfilling bellholes was then done in the same way that adjoining trench was handled. Completion of backfilling in bore slots was accomplished by mechanical compacting to within 6 ft of the ground line and then proceeding as in adjacent trench.

In the Chino Hills both trench and bellholes were backfilled dry and rolled.

Proof testing

Proof testing in the city section was done in four sections. The first, starting at Cucamonga, was tested hydrostatically to 1300 psig for a minimum of 24 hours. The second section was exactly similar. The third section, running through the Chino Hills, was tested with gas to 965 psig. The last section was hydrostatically proofed at 1178 psig.

Air pressure was used to build backpressure on the line when sections two and four were given their hydrostatic. The same air compressors were used to remove the water from these sections.

On the third section to be gas tested, the line was blown down with gas. Gas was taken from a 30-in. line that crossed the 36-in. job in the section.

It was introduced at a block valve between the ends of the test section. The 36-in. line was filled for about 1000 lineal feet of inert gas on both sides of the block valve before gas was introduced for the blowdown. Welding caps were used to form end closures and the line was then brought to the test pressure.

After proof testing and completion of all work, the entire work in the city section was given a stand-up test for at least 48 hours with the highest gas pressure available at that time.

• Winding it up

All field engineering and construction inspection was handled by Southern California Gas Co. personnel. These SoCal people supervised the overall project:

M. J. Binckley, project engineer, major pipelines.

Jack T. Wootan, supervisor of contract construction. A. W. Shaw, supervisor of major pipelines. ■

Tower with passive reflectors rises 300 ft into the air at Minden, Neb. Inset is a close-up of the reflectors.

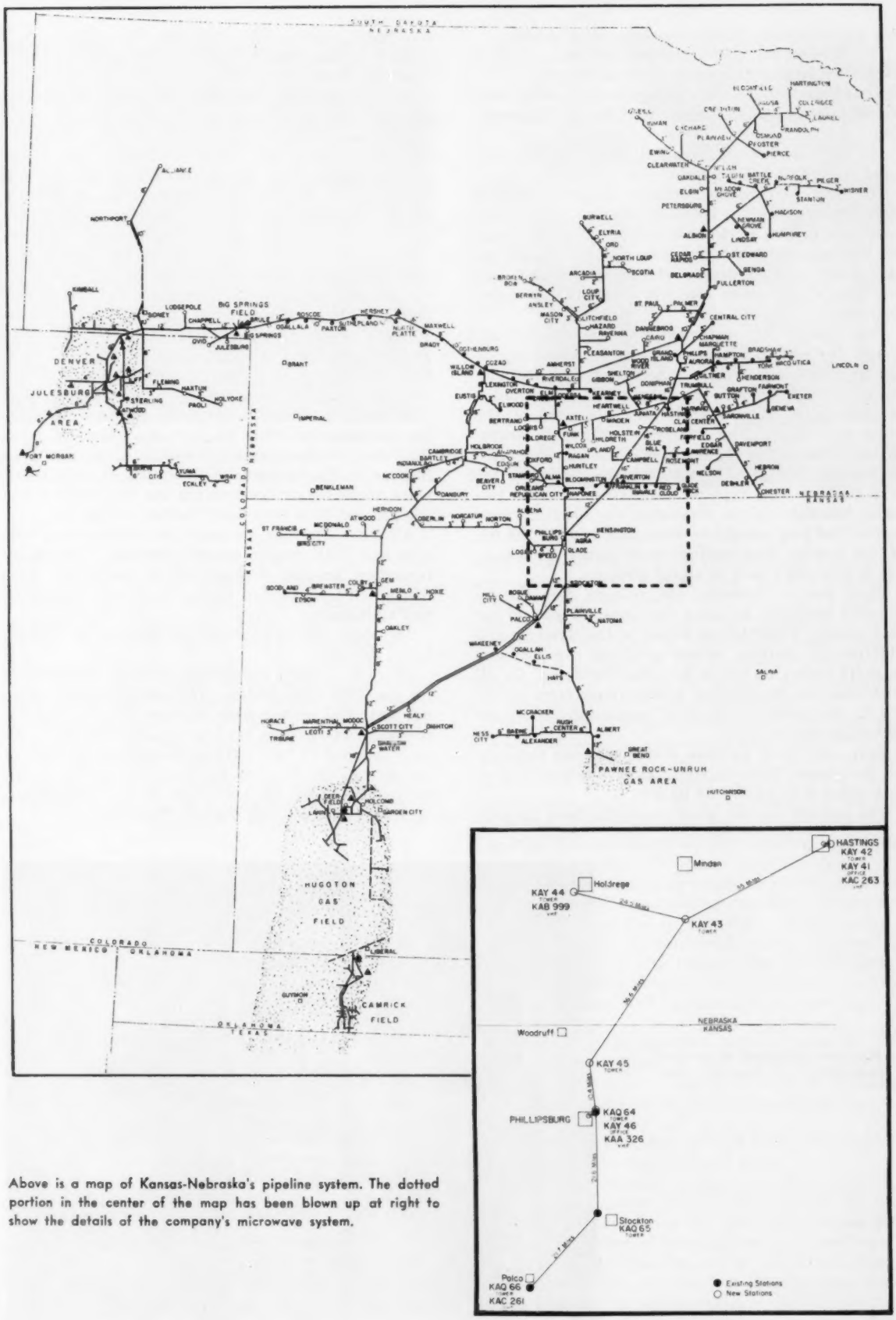
Kansas-Nebraska expands its microwave system

By A. J. SIGEL, Communications Supervisor
Kansas-Nebraska Natural Gas Co., Hastings, Neb.

KANSAS-NEBRASKA NATURAL GAS CO. has expanded its microwave system twice since the initial installation three years ago. Two more major expansions are planned. This growth indicates our acceptance of this mode of communications as the major method of providing a general communication service for production, transmission and distribution activities and making possible centralized supervision of the entire pipeline operation through selective telemetering.

Our microwave network presently consists of two separate systems, which will probably be joined by our next expansion. A total of 21 sub-carrier channels are multiplexed on to the larger system. The smaller system has four channels.

The company office at Phillipsburg, Kan., was joined to the Palco, Kan., compressor station in 1957 by the first portion of the system. This link covers 43 miles in two hops. In 1958, the second leg was completed, spanning the 62 miles between the production processing facilities at Tyrone, Okla., and the Lakin, Kan.,



Above is a map of Kansas-Nebraska's pipeline system. The dotted portion in the center of the map has been blown up at right to show the details of the company's microwave system.

field headquarters. Again two hops were needed.

The third section, just completed last year, extended the system from Phillipsburg north to Hastings, Neb., our headquarters. A stub brings in our compressor station, pipe yard and other facilities at Holdrege, Neb.

The last expansion bridges 108 miles, utilizing four repeater stations. (See system map for details.)

The entire systems, provided by Motorola, operate on frequencies between 6500 and 6800 mc. MR-10 RF equipment is used in the first two portions, MR-20 on the last section. Both types have a high channel capacity with a high degree of reliability. Both use long life, stable reflex klystron tubes as the major elements.

This type of RF equipment was specified for our system for several reasons. One is its capability of flexible antenna systems. In normal station installations with high towers, the antenna dish is mounted horizontally at ground level, usually on top of the equipment shack. The microwave energy is transmitted to the top of the tower where a passive reflector bounces the signal in the desired direction to the next station. This type of installation provides two major benefits: (1) it eliminates any electrical connection and long coaxial or waveguide runs to the top of the tower, thus easing maintenance problems; (2) it provides a gain in signal strength.

When desired, however, the antenna dish can be mounted vertically, beaming the signal directly to the next station. This method is used at the Hastings and Phillipsburg stations, where antennas are mounted on short towers on top of our office buildings. On all other stations, where steel towers range from 110 to 330 ft, the horizontal mounted antenna-to-passive reflector system is used.

Four- and six-ft antenna dishes are used throughout the system. Tower-mounted passive reflectors measure either 8 by 12 ft or 6 by 8 ft.

The stations on the latest expansion have prebuilt equipment shacks. The units are truck bodies, 8 ft wide, 8 ft high and from 8 to 16 ft long. The bodies come prewired, prelighted, with built-in ventilation, lined with plywood and with 2-in. floors. Equipment installation at these stations was very simple.

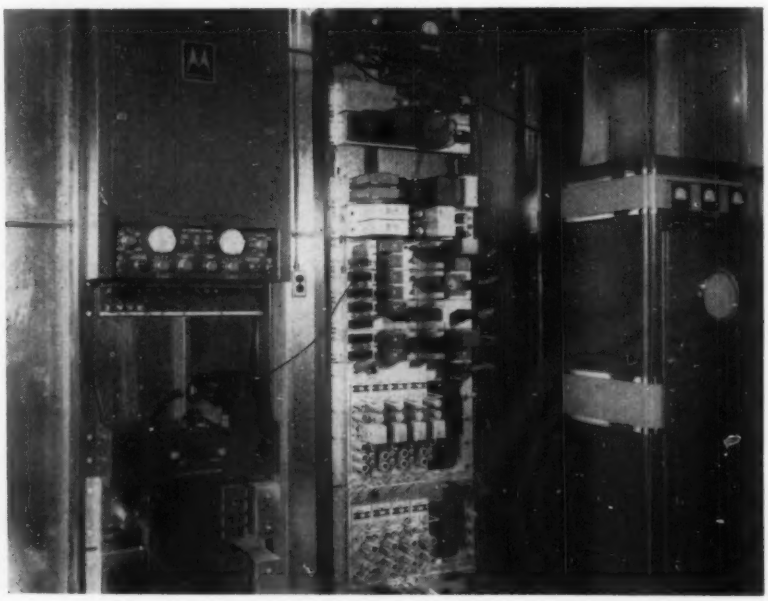
The channelizing diagram indicates the extent of our multiplexing. The older portions of the system were equipped with 24 channel FM multiplex; the newer section has the new Motorola MC-20 48-channel FM equipment. Besides normal voice and VHF control multiplex terminals, voice frequency carrier equipment is used in certain of the stations to provide teletype and telemetering service.

Following the channelizing diagram provides a good picture of the usage made of our microwave system. There is duplex telephone service between Hastings, Phillipsburg and Palco. This is a push-to-ring party line. There are also three private circuits between Hastings and Phillipsburg. Two terminate in company PBX boards while the third provides a private line between the offices of Company President S. D. Whiteman in Hastings and Secretary-Controller Fred Steffens in Phillipsburg. Another duplex circuit provides telephone service between the Phillipsburg dispatcher and Vice President Thomas Creigh Jr.

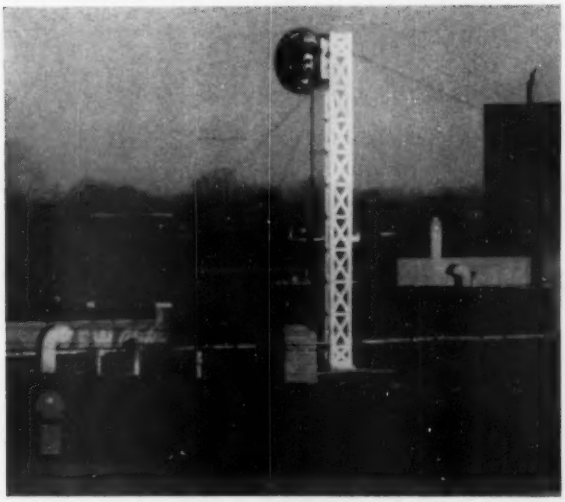
All other channels are used for telemetering, teletype and VHF remote control purposes. Certain information, brought to Hastings by leased line from Albion, Neb., is carried by the microwave system on to Phillipsburg.

The same type of channels are used in the Tyrone-Lakin system.

There is a single dispatching point at Phillipsburg for the VHF radio system. Through microwave channel control of certain base stations, the value of our two-way radio system has been greatly increased. We have installed 28 base stations throughout our area of operations, and have 90 mobile units, mostly in the production areas of southwest Kansas, Oklahoma, northeast Colorado and western Nebraska.



Microwave equipment at company headquarters in Hastings, Neb.



At Hastings and Phillipsburg, antennas are mounted on short towers on top of K-N buildings (above). Microwave dishes are mounted on prebuilt equipment shack (right) at Minden repeater station.

Two-way radio gives us blanket coverage of our entire pipeline for our mobile radio-equipped vehicles. Mobiles have been installed in maintenance trucks and supervisors' vehicles as well as in other vehicles. We also have radio in two planes, used by company executives to get to meetings, trouble spots, etc., in a hurry.

Our mobile radio system has helped increase overall company efficiency. Supervisors needed immediately at trouble spots can be radioed there in seconds. Maintenance trucks are radio dispatched to handle repairs such as line breaks. Drivers on field meter routes, miles away from "civilization," can radio for help if in distress. These are just a few examples of the many time and money saving uses of our two-way radio system.

In addition, by use of a microwave channel, the pressure dispatcher at Phillipsburg can broadcast over short wave stations at other locations eliminating the need for manually relaying the transmission.

Thus far, our discussion has been limited to a description of the microwave system and the benefits of VHF radio. To justify the cost of this extensive system, maximum utilization must be achieved. Kansas-Nebraska feels that it is receiving the full benefits it sought in microwave and we are confident amortization will be achieved in a normal term of years.

We needed a comprehensive communications system for many reasons. In a single phrase, the reasons add up to the efficient operation of our business. Kansas-Nebraska began operations in 1936 and has become known as "America's Rural Pipeline Company" because of the comparatively small communities it serves over a widely scattered area. Much of our industrial load comes from agricultural enterprises such as the alfalfa dehydration industry, beet sugar plants, irrigation engines and grain dryers. Electric generating plants also make up a large part of our industrial load.

The population of the area served by Kansas-Nebraska is over 313,000. In 66 wholesale and 156 retail communities, we serve about 120,000 customers. Approximately 720 regular and 75 part-time employees operate our system. We maintain and operate some 5000 miles of gathering and transmission lines and about 1000 miles of distribution lines. About 44,000 hp is installed in the various compressor stations throughout the pipeline system. Daily transmission system capacity is about 225 MMcf.

The scope of our operations reveals our need for efficient and reliable communications; the kind given us by our microwave system. Routine and confidential company business is conducted many times daily over our telephone circuits. Our telemetering and teletype transmit such information as pressure readings; readings from flow meters at pumping stations, and daily reports and orders to Phillipsburg or Hastings.

Kansas-Nebraska has developed a remote pressure regulator control by adapting standard equipment, both electrical and gas, to our needs. Control consists of standard pilot regulators and controls operated by stepper-type positioning relays. The electromagnets in the relay turn or position the pilot control shaft so that the regulator will increase or decrease pressure in response.

We operate these regulator controls from our dispatch point in Phillipsburg over microwave channels. The same sub-carrier channels provide a telemeter signal back to dispatch so that the operation may be observed and checked.

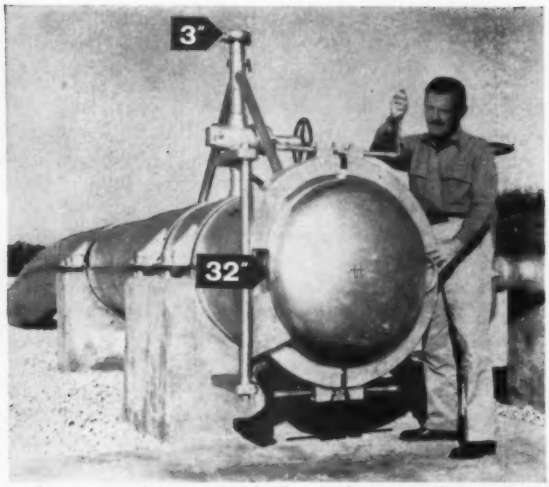
Protection is provided by high-low pressure limit switches and time limit thermal relays.

Pushbutton operation is used, and since control is by impulse, the operation must be repetitive. We feel this is an advantage since a held-down button will only give one operation pulse and prevents over-travel. Operation can be at a rate of 10 pulses per second so time is relatively unimportant in effecting a pressure change.

Why did we decide on a microwave system? Basi-

NEW...FROM TUBE

an improved hinged closure for pipe lines, piping and process equipment



One man, using any standard wrench, can easily open or close the TUBE-TURN *Hinged Closure. Has important safety features, too!*

For vertical applications, TUBE-TURN *Hinged Closures can be equipped with spring-loaded, counterbalanced caps.*

Tube Turns announces a new line of hinged closures with important advantages for pipe lines, piping and process equipment wherever frequent access is required or where the use of blind flanges would be cumbersome and time consuming. Proved in scores of applications by major companies, the unique TUBE-TURN* Hinged Closure provides these benefits:

Saves installation time. Light weight assembly easier to handle. Completely fabricated . . . ready to install. Requires only one butt-weld to join to pipe, tank or vessel opening.

Saves operating cost. One man, using a standard wrench, can easily open or close the largest size closure in a few minutes. No threads or lugs to engage or flanges to line up. No parts to fail. No hammering or tugging. Can be adapted to motorized operation. Closures for vertical applications can have counterbalanced caps for easy operation.

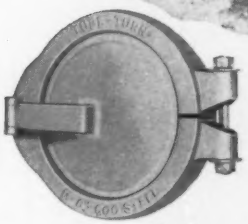
Saves on maintenance. Oil resistant, self-energizing static "O" ring provides seal. Does not move when cover is opened or closed. No rubbing or chafing to shorten seal life.

Built-in safety. Exclusive design features of two-piece yoke, double-ended right- and left-hand threaded bolts and hinged cap guard against accidental opening under pressure.

These new TUBE-TURN Hinged Closures provide still another *plus value* you can get when you specify TUBE-TURN products and buy them from your nearby Tube Turns' Distributor. They are available in sizes 2" through 42" for A.S.A. 150-lb, 300-lb and 600-lb service . . . in steel or alloys.

*"TUBE-TURN" and "tt" are trademarks of Tube Turns.

TURNS...



Above: 32-inch TUBE-TURN Hinged Closure. This type with right-and-left hand threaded yoke bolts is available in sizes 8" thru 42". *Left:* Single bolt type closure is available in sizes 2" thru 8", removable or swing bolt.

Another tt *plus value from...*

TUBE TURNS

DIVISION OF CHEMETRON CORPORATION

Louisville 1, Kentucky

CHEMETRON

DISTRICT OFFICES: Atlanta • Buffalo • Chicago • Columbus • Dallas • Denver Detroit • Houston • Kansas City • Los Angeles • Midland • New York Philadelphia • Pittsburgh • Richmond • San Francisco • Seattle • Tulsa
In Canada: TUBE TURNS OF CANADA LIMITED, Ridgetown, Ontario
District Offices: Edmonton • Montreal • Toronto
In Mexico: TUBE TURNS DE MEXICO, Mexico City

FREE BULLETIN... Complete information on the new line of TUBE-TURN Hinged Closures will be sent on request. Mail coupon.

TUBE TURNS, Dept. GM-8
224 E. Broadway • Louisville 1, Kentucky

Please send Bulletin TT956 on new TUBE-TURN Hinged Closures.

Company Name _____

Company Address _____

City _____ *Zone* ____ *State* _____

Your Name _____

Position _____

Phillipsburg dispatcher Ray Gower (left) records results of transmission to mobile in the field. Transmission superintendent Ralph Shirley (above) transmits message over mobile radio unit.

cally, for two reasons: economy and reliability. Microwave is economical because it simply costs less than leasing wire line when you use as many channels as Kansas-Nebraska does. And, with the Motorola FM multiplexing, we can expand to 48 channels.

Reliability is very important to us, especially in the winter season. A break in our communications chain could be disastrous. Our microwave system has withstood the bitter tests of winter weather throughout the past years. Wire line failure is always a possibility—more often in winter.

Our microwave system reaches every desired area. At some locations of our pipeline operations, the telephone line facilities are inadequate or not even available. With microwave, we establish an unbroken chain along our pipeline. We could not do this if we leased wire lines.

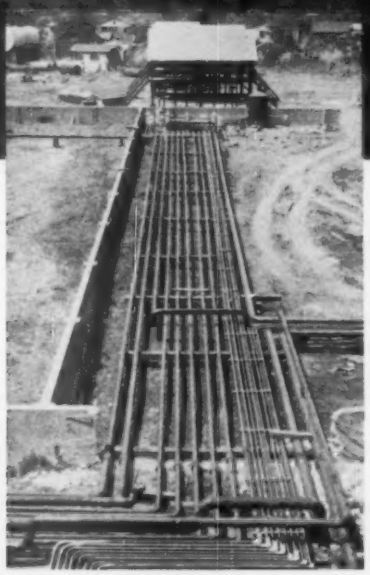
This second microwave advantage gives Kansas-Nebraska better service—a third benefit. Service is better because it is uninterrupted, thanks to reliability.

The proof that our microwave system is what we need comes from our continued expansion. The link recently completed gives us communications in the area of our main offices. The next links will give us a complete north-south microwave system and extend to our operations west. If we weren't satisfied with microwave, we would not continue to expand. ■

Channelizing diagram of Kansas-Nebraska's microwave system.

SUBCARRIER CHANNEL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	DO-SPATCHER	DO-SPATCHER	DUPLEX-DISPATCHER	DUPLEX-DISPATCHER	TELEMETER	TELEMETER	TELEMETER	VHF	DUPLEX-PRIVATE	DUPLEX-PRIVATE	DUPLEX-PRIVATE	DUPLEX-PRIVATE	DUPLEX-PRIVATE	VHF	VHF	TELEMETER	TELEMETER	TELEMETER	TELEMETER	TELEMETER	TELEMETER
HASTINGS OFFICE			T	R					T	R	R	T		T	R	T	R				
HASTINGS REPEATER													T R								
MINDEN REPEATER																					
HOLDREGE (STUB)																R	T	T	R	T	R
WOODRUFF REPEATER																					
PHILLIPSBURG REPEATER																					
PHILLIPSBURG OFFICE (STUB)	R	T	R	T	R	T	R	T R	R	T	T	R	R T	R	T			R	T	R	T
STOCKTON						R	T														
PALCO	T	R			T			R T													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

QUALITY PIPELINES



Another fine service of *LATEX* is the construction of MARINE & PIPELINE TERMINALS. *LATEX* offers personnel skilled in this phase of the industry.

LATEX QUALITY LINE CONSTRUCTION

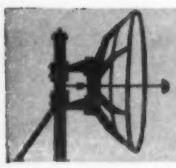
LATEX offers line construction of the highest caliber. This statement is backed up by more than one quarter century service to the oil and gas industry. Repeating Business has been the keynote to success of this growing company. For your next quality line invite *LATEX*.

REMEMBER, LATEX QUALITY CONSTRUCTION BRINGS REPEAT BUSINESS

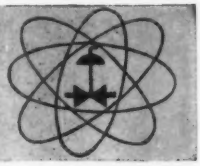
LATEX
SERVING 1/4 CENTURY

LATEX CONSTRUCTION COMPANY

P. O. BOX 12128 · ATLANTA 5, GEORGIA · CE 3-9414



Communications and Automation



Edited by FRANK CHAPMAN

Two views on automation

WE were interested in two points of views expressed on the subject of automation during the past several months. Both were presented in papers before the Southern Gas Association in Galveston during April.

William F. Haley, Union Switch & Signal, gave his definition of automation in this way: "The word automation has been used quite freely throughout the pipeline industry. I have heard it used in association with small indicating panels with five or six lamps that are lighted manually by a dispatcher as a result of an oral telephone report from the field. I think you will agree with me that the word 'automation' is not properly used in this instance. *I think of automation as a 'man-acting machine.'*"

Then, H. O. Porter, Cities Service Gas Co., gave his slant on automation:

"I can give you my opinion on this subject in about 30 seconds. Consider the word 'automatic' from the dictionary; this word comes from the Greek word 'automata,' which means self acted or self acting. From this definition, it would appear that all internal combustion engines have been equipped with automatic controls for many years. The governor and throttle, inlet and exhaust valve mechanisms, lubricating equipment and many others. These automatic controls were installed by the engine manufacturers for only one reason: *'To obtain more reliable operation of the equipment.'* This is my opinion of the proper 'approach to automation.'"

While not exactly divergent opinions, one goes a lot further than the other, yet they both wind up at the same place. Perhaps neither approach puts the needed emphasis on economics. By that we mean not only economics of operating a given compressor engine, but the economics of the overall gas industry.

It is not newsy to report that the price of gas to consumers is going through an upward trend. In the chain of the way of life in the gas industry, natural gas producers are able to raise the price of gas in the field even while regulated by FPC. Pipeline companies in turn must recover their higher cost of gas by raising the rates to gas distribution customer-utilities. Distributors then have to recover their increase cost of gas from ultimate consumers.

This is not the place to debate whether each of these segments of the industry is or is not getting too much or too little for its particular part of finding natural gas and delivering it to customers' utilization equipment. The plain, simple truth is that the price of gas has gone up since the forties and seems destined to continue to do so, until some unknown point is reached.

It is also plain simple fact that some individual consumers, consumer groups, state regulatory commissions, and the FPC are well aware of this and are working overtime to find a pattern, formula, or other equitable basis for stopping this advance.

This corner will have to say that it joins the bulk of regulatory officials and gas company managements when it comes to working out a completely equitable solution to the price spiral. We don't have an overall answer either.

But consider AUTOMATION as submitted for at least a partial or interim solution in either holding current prices or absorbing some of the impact from higher costs of gas.

Consequential applications of the art have been made to individual facilities of some companies. Some pipelines have designed their systems with a relatively advanced degree of automation built in. Distributors, too, have made applications in selected areas, if not in depth.

The area for automation in the gas industry is unlimited. Systematic automated control of production, gathering, treatment and extraction, storage, transportation, and distribution functions in the gas industry is possible and seems practical. The industry might well find that a partial solution to pricing problems may evolve from automation of most of its physical operations. At the very least, it seems that "more reliable operation" and "man-acting machines" can cut labor costs and absorb some of the impact, for a while, of the gas price increase trend.

New communications center in Cedar Rapids

Collins Radio Co. is building a two-story communications and data processing center in northeast Cedar Rapids. When completed, the 38,000-sq ft center will house a fully operational system of Collins single sideband and microwave communication equipment and a centralized computing system.

The centralized computing system will be used directly by all company divisions through the U. S. and Canada. Information will be sent into a giant IBM 7070 computer by an extensive company data link system, the Kineplex.

Inventory, shipping, receiving, production and payroll records, etc., needed for daily operations will be sent by wire into the central computing system, and the data will be fed back to the individual branches from the Cedar Rapids center.

Also housed in the new center will be the central communication switching facilities.

MR-20 MOTOROLA MICROWAVE

for unequalled "on the job" performance

Motorola's *experience* in microwave design, manufacture and installation guarantees full communications satisfaction where it counts—on the job. Outstanding operational flexibility, long-life service and all-weather dependability, are service proved facts in public safety, industrial and utility applications throughout the country.

Simple "building-block" components—MR-20 RF units and associated multiplex equipment—are fitted to your exact required combination of voice, printed message, control signals and data transmission—including 2-way radio operation. Multi-channel, point-to-point operation spans any distance . . . carries your messages at low per-mile operating and maintenance costs.

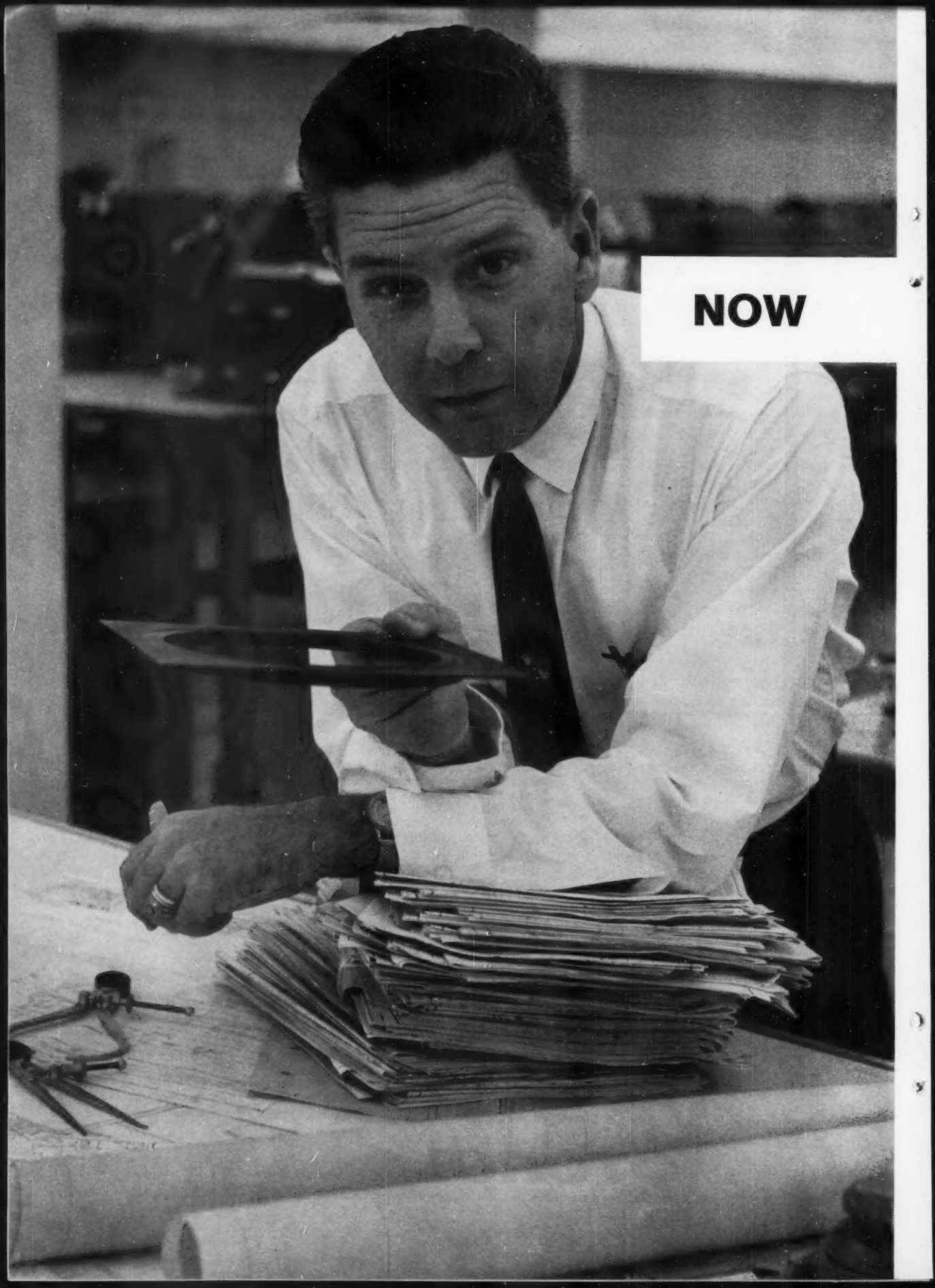
What are just-right communications worth to your operations? It's easy to find out. Have your Motorola microwave representative show you on-the-job examples of full-efficiency microwave performance. Write or call today for details.

MOTOROLA ADVANCED DESIGN MAKES THE BIG DIFFERENCE

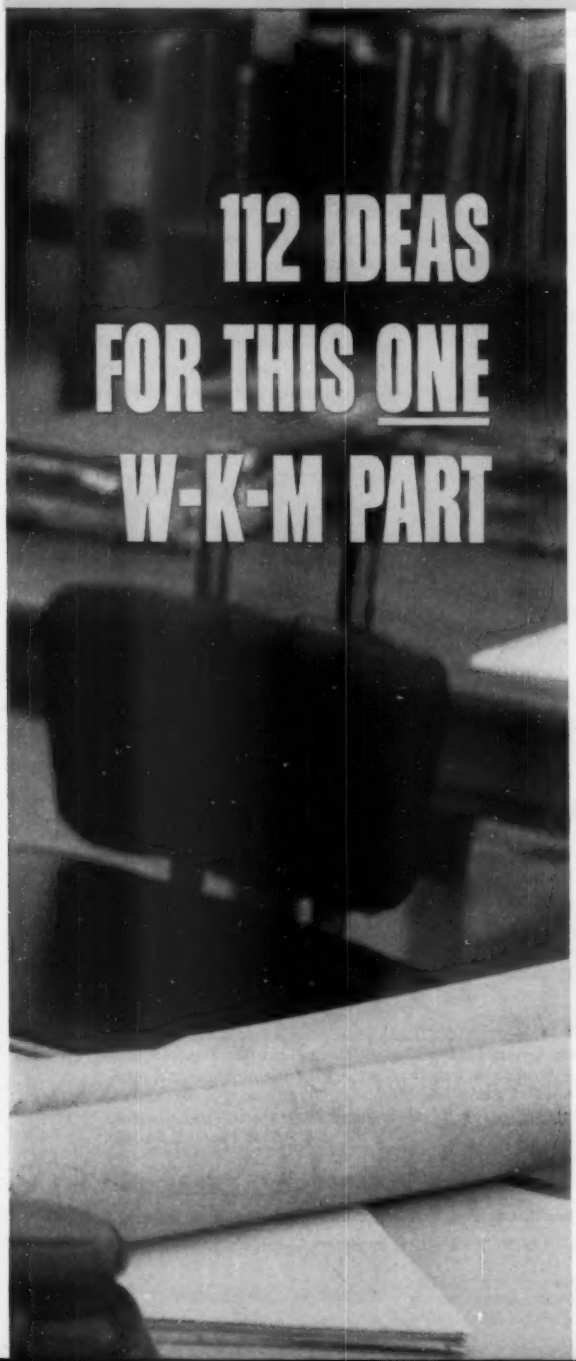
- **Automatic switchover-switchback**
- **"Hot" standby**
- **Simplified Waveguide**
- **Plus outstanding Motorola 6000 MC operational developments for optimum system performance.**

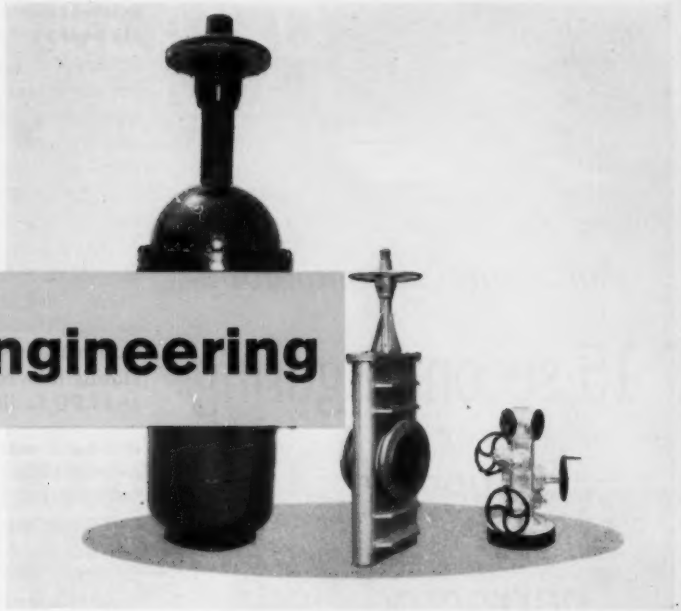
MOTOROLA *MICROWAVE*

Motorola Communications & Electronics, Inc., 4501 Augusta Boulevard, Chicago 51, Illinois • A Subsidiary of Motorola Inc.


NOW

TOTAL Valve Engineering





Left to right above, W-K-M's new: *Safe-T-Seal* Gate Valve (ASA); Pressure Sealing Gate Valve (ASA); Cross-type Triple Gate Valve (API).

New valves are being developed to outperform any you've ever known

From 112 designs by W-K-M engineers came an unusual valve seat. It is the secret of performance in W-K-M's new Pressure Sealing Gate Valve . . . and a hint of things to come.

Under wraps in W-K-M's Research and Development Laboratory are experimental valves looking like none you've ever seen . . . prototypes being tortured to simulate a lifetime of hard service. And, in restricted field installations, new models with no marking or identification, are making their final test runs.

W-K-M's exhaustive research and development program is a vital part of TOTAL Valve Engineering—W-K-M's unique dedication to *all* phases of valve technology. From it come today's valves and valves of the future . . . designed to work better, last longer . . . on the world's toughest jobs.

W-K-M

DIVISION OF ACF INDUSTRIES
INCORPORATED
P. O. BOX 2117, HOUSTON, TEXAS

6002

Automatic . . . continuous

15-second figuring gives total corrected flow in Bridgeport

Bristol telemetering computer system helps gas dispatcher operate near contract limit yet avoid penalty charges.

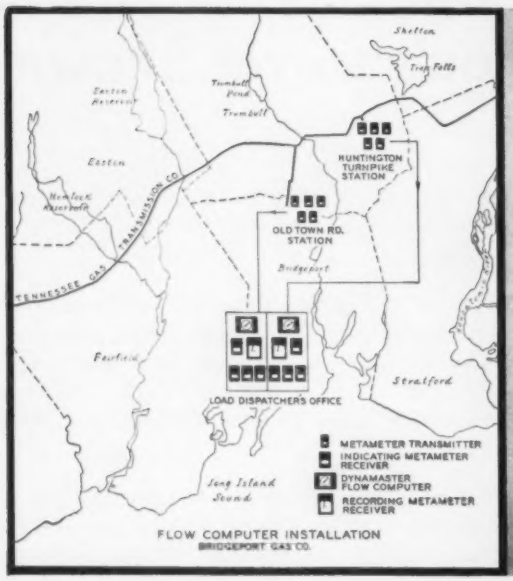
Bridgeport Gas Company, Bridgeport, Connecticut, operates in a heavily populated, heavily industrialized area. Toward the end of a peak-load period, penalty charges for exceeding the contract limit on purchased natural gas might easily amount to a substantial sum of money—even in the ten minutes it would take to compute manually the total corrected flow from their two city gates (see map), each of which is under separate contract.

But, Bridgeport Gas has found a way to ease this problem: Their Bristol telemetering computer automatically and continuously totalizes and corrects gas flow to within the last 15 seconds of consumption. The corrected flow is presented—along with other information—in the central dispatcher's office so that he can instantly take remedial action, drawing upon "peak shaving" storage and LPG facilities, if an over-run condition appears likely to develop.

It's been estimated that savings from one ten-minute over-run, prevented in this manner could more than pay for the cost of the entire Bristol computer set-up.

This is typical of the outstanding jobs Bristol telemetering is performing today for gas pipelines and distribution companies, oil pipelines, electrical transmission networks, water plants, and industrial plants. Pressure, liquid level, flow (including total corrected flow), temperature, mechanical motion, voltage, current, and electric power are just a few of the variables that can be transmitted. Distances may vary from a few yards to hundreds of miles. Almost any transmission medium may be used: telephone lines, carrier current, and radio—microwave, VHF and UHF.

Let us send you more data on Bristol telemetering. And, of course, thoroughly experienced Bristol applications engineers are always ready to talk over your specific problems with you. Write: The Bristol Company, 119 Bristol Road, Waterbury 20, Conn. 0.28



This Bristol Telemetering Computer Panel gives Bridgeport Gas Company dispatcher complete data *in seconds* on pressure, temperature, and corrected totalized flow of purchased natural gas. Flow-computing Dynamaster* instruments for each station (see map) are at top of panel; integrating counters are directly below them. **T.M. Reg. U.S. Pat. Off.*

BRISTOL... for improved production through measurement and control

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

NEW AT BEAIRD

A vigorous new future for...

TIME PROVEN MAXIM SILENCERS

New relief from a noisy mechanical world is symbolized by the combined AMF-Beaird-Maxim emblem. Now in production at Beaird, Maxim Silencers are the latest to join AMF's industrial family of more than 185 fine products for consumers, industry and defense.

Industrial designers, architects and engineers concerned with noise control will find a new depth in research, engineering and manufacturing facility. AMF's five research laboratories and Beaird's steel fabricating experience in the oil, gas and petrochemical industries assures continuous product improvement.

Qualified sound control engineers at AMF-Beaird-Maxim are ready to work with you on every silencer requirement from ocean going steamers to industrial plants . . . jet engines or even home lawnmowers.

Other Beaird products include packaged compressor plants, pressure storage vessels, LP-Gas and NH3 tanks, trailer transport tankers, cast steel fittings and specialized process vessels.

To put this experienced team on your project . . . contact your nearest Maxim Silencer agent or write direct.

another AMF BEAIRD product

THE J. B. BEAIRD COMPANY, INC.

A subsidiary of American Machine & Foundry Company

Shreveport, Louisiana

SALES OFFICES: Shreveport, New Orleans, Louisiana • New York, New York • Tulsa, Oklahoma • Houston and Midland, Texas
BEAIRD INTERNATIONAL, INC., SHREVEPORT, LOUISIANA • Sales Offices: Calgary, Alberta, Canada • Caracas, Venezuela
MANUFACTURING PLANTS: Shreveport, Louisiana • Clinton, Iowa

now... three

PARTNERS IN JOHNS-MANVILLE PIPELINE PROTECTION

Now one single source takes on complete responsibility for any field wrapping job in pipeline protection! Johns-Manville manufactures wraps to meet every soil condition, every pipe wrap requirement. An enlarged staff of sales and technical personnel operates out of 13 sales offices . . . backed by modern research and development laboratories and 4 strategically-located plants. You can get further information by writing Johns-Manville, Box 158, Dept. G-860, New York City 16, or in Canada at Port Credit, Ontario.

1

FOR ENAMEL REINFORCEMENT

J-M BLUE FLAG WRAP

This wrap is specially-formulated from borosilicate type fiber glass that can't rot, decay or absorb moisture. Uniformly porous, Blue Flag allows enamel to bleed through quickly to minimize holidays and helps form an evenly distributed coating with high resistance to soil stresses. Adds years of protective life.

2

FOR A TOUGH OUTER SHELL

J-M ASBESTOS FELTS

They resist soil stress, earth movement and rock pressures . . . withstand damage from handling, backfilling and other installation hazards. Felts are made of asbestos, a fibrous stone. In manufacturing, these fibers are felted, then impregnated with a coal tar or asphalt saturant to provide, literally, a flexible covering of stone.

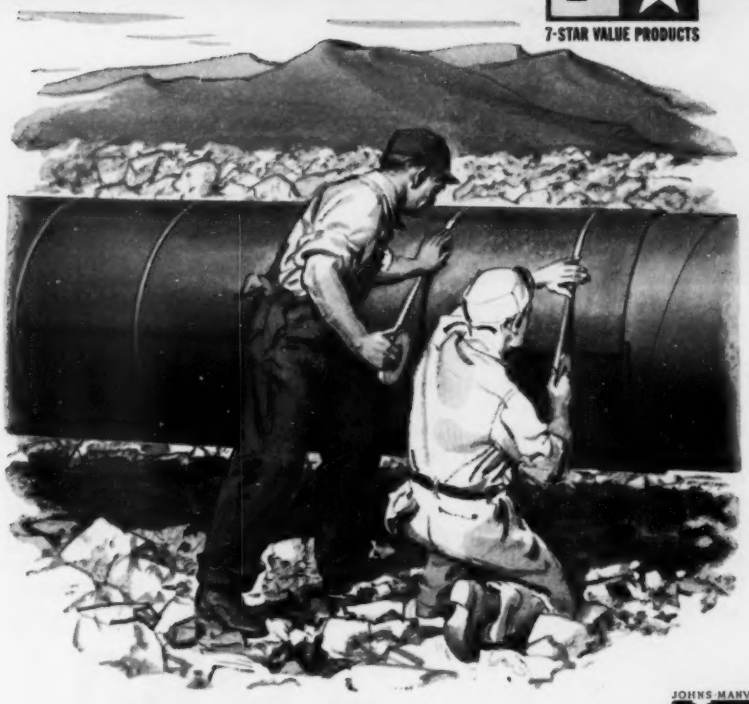
JOHNS-MANVILLE J-M 7★ 7-STAR VALUE PRODUCTS

3

AND NOW

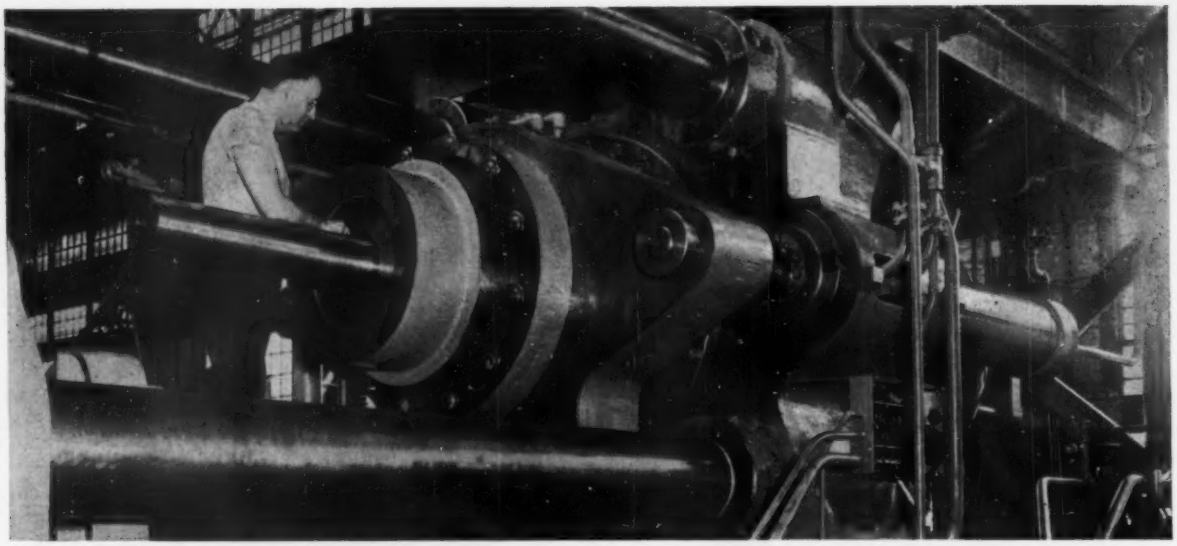
J-M FLEXIBLE ROCK SHIELD!

It provides an added shield for pipe coating on lines running through rocky, rugged terrain. J-M Flexible Rock Shield is a tough asphalt mastic board . . . a resilient padding that forms an extra cushion against rupture and impact. J-M Flexible Rock Shield is a low cost way to prevent high cost maintenance problems.



JOHNS-MANVILLE

JOHNS MANVILLE JM PRODUCTS



SUN SHIP has what it takes to build . . . . .

for INDUSTRY

We're old hands at building complete machines and special equipment for use in a wide range of industries. For 44 years our large and amply equipped shops have produced items ranging from small tanks to huge fractionating towers, pressure vessels, stills, plate work and special-purpose machinery for the chemical, petroleum and other industries.

Pictured here are a hydraulic press, which was shipped by rail, and a fractionating tower ready for loading on a barge for shipment by water to an oil refinery. They are just two examples of the equipment Sun Ship contributes to many fields, also examples of our shipping facilities.

Because we have all the facilities, we build all equipment right in our own plant, without subletting. Our convenient location on the Delaware River, with direct access by rail and water to all points, assures speedy delivery.

Let Sun Ship solve your machine or equipment problem. Phone or write our Sales Engineering Department.

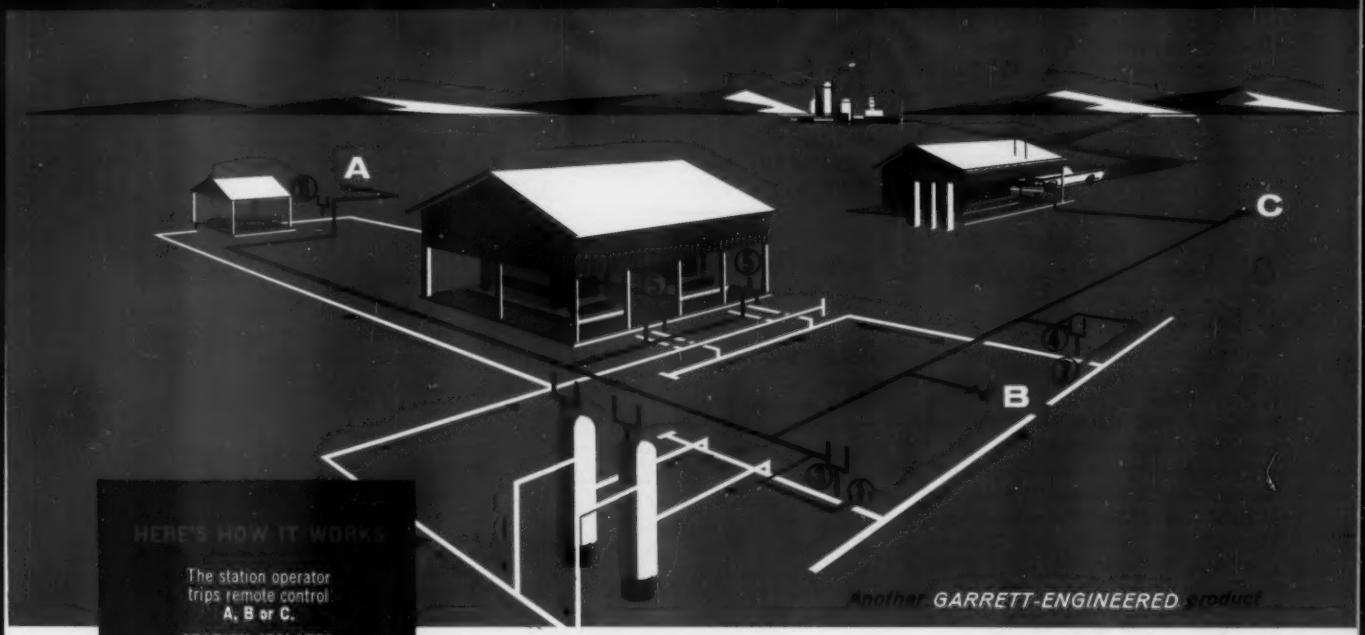
Sun

SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE • SINCE 1916 • CHESTER, PA.

New Safety! *for compressor stations*

GARRETT SAFETY SHUT-IN SYSTEM



HERE'S HOW IT WORKS

The station operator trips remote control A, B or C.

STATION ISOLATED

Suction firegate closes

Discharge fire gate closes

PRESSURE DISCHARGED

Suction relief valve opens

Discharge Relief Valve opens

Compressor unit relief valves open

ENGINE SHUT DOWN

Fuel gas relief valve opens

Tripping a single remote control instantly isolates a compressor station from the main line while simultaneously cutting off engine fuel and blowing down internal lines in Garrett's new safety shut-in system.

The station can be restored to service quickly without purging of lines. Block valves permit continued operation of station during periodic blow down testing of valves without loss of thousands of dollars in gas.

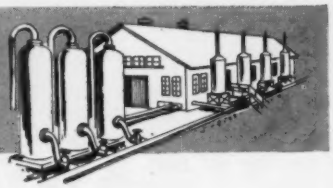
Designed to work with relief valves normally installed at compressor stations and with existing engine starting air pressure . . the Garrett safety shut-in system may be obtained for little more than the cost of adding "type EO" operators to the existing relief valves.

Check with your nearby Garrett representative or write direct for the full story of this NEW safety shut-in system for your compressor stations.

USI **Garrett Oil Tools**

DIVISION OF U. S. INDUSTRIES, INC.
P. O. BOX 2427, LONGVIEW, TEXAS

GAS PIPELINE NEWS



Texas Gas, Shell case returned to lower court

Texas Gas Transmission Corp. won a round in the Supreme Court in its fight to avoid a gas price hike demanded by Shell Oil Co., one of its suppliers.

The high court unanimously held that Shell was not entitled to a price increase under a 1954 "letter agreement."

But, it directed a lower court—specifically the U. S. Circuit Court in Philadelphia—to re-examine questions related to Texas Gas' purchase of gas from Atlantic Refining Co.

Shell contends that its agreement entitles it to a higher price if Texas Gas contracted to pay a higher price to another producer, this time Atlantic Refining.

The Supreme Court says the circuit court must first decide a contention that a 1943 Texas Gas-Atlantic agreement did not provide for a fixed price beyond the first five-year period.

FPC held a price redetermination under Texas Gas' contract with Atlantic was not "entering into a contract" within the meaning in Shell's contract with Texas Gas. Therefore, Shell was not entitled to an increase.

The Philadelphia court reversed the FPC. Then FPC, Texas Gas, and Louisville Gas & Electric appealed to the Supreme Court. Louisville is a principal customer of Texas Gas.

Offshore purchase okay if price reduced

Tennessee Gas Transmission Co. can buy offshore Louisiana gas, if initial price is reduced from the proposed 21.3 cents to 16.4 cents per Mcf (Docket G-1661 et al).

Sales from the Rollover and Hog Bayou fields would total 60.7 MMcfd. Phillips Petroleum and Kerr-McGee would sell Rollover gas to Commonwealth Oil Co. for resale to TGT. Gas from Hog Bayou would be sold direct to TGT by Phillips and Kerr-McGee.

Total reserves in the field—all dedicated to TGT—are an estimated 566.66 billion cu ft. Sales are now being made under certificates issued two years ago.

Previously the gas was sold to Niagara Gas Transmission Ltd. TGT transported it from Louisiana to a point on the U. S.-Canadian border near Niagara Falls, N. Y. This sale was made under a 1953 contract at 16.4 cents per Mcf. Under an escalation clause in the contract, the price went up to 21.3 cents in November 1958. That same month, Niagara ceased buying the gas and assigned its purchase rights to Tennessee.

Citing the CATCO and Transco cases, Examiner Binder said the companies have the burden of establishing that the proposed initial rate is required by public convenience and necessity. The burden was not met in this case, he said. Instead, the only basis claimed in support of the higher price was that this figure represented the initial price. Also, others in the area were selling at that level when the escalation provisions became effective in 1958.

Binder said that the 21.3 cent price had not been adequately justified by the applicants.

Missouri sale reaffirmed

An FPC examiner has reaffirmed FPC action directing Michigan Wisconsin Pipe Line Co. to supply gas to Central Missouri Gas Co., Jefferson City. Central Missouri will distribute the gas in Kirksville, Queen City, Lancaster and Greentop, Mo.

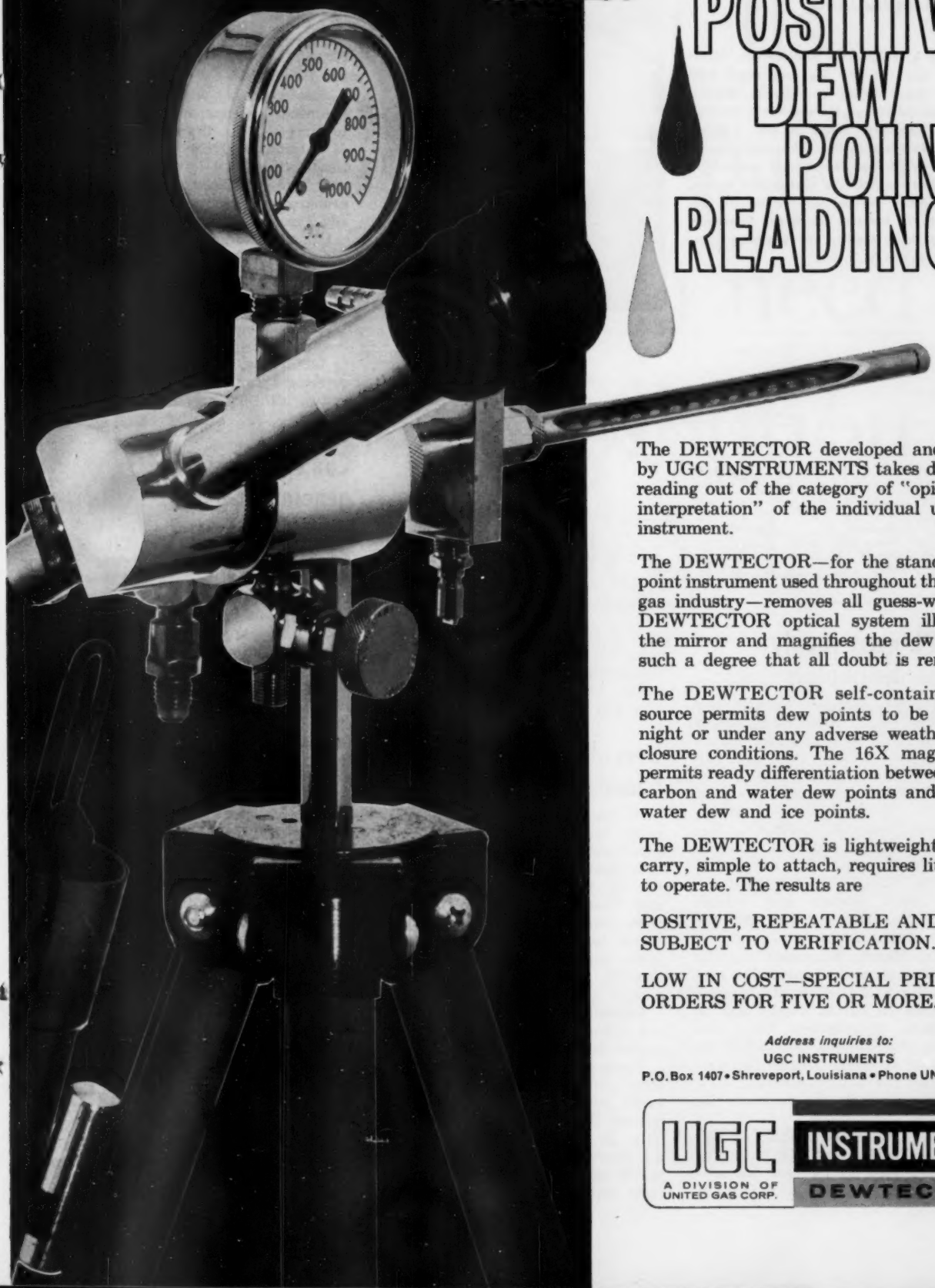
FPC approved the plan last October (Docket G-18313 et al). But, in January the case was reopened when Missouri Midland Gas Co., Kirksville, objected. Missouri Midland distributes propane in the area to be served by Central Missouri. The propane distributor questioned the feasibility of Central Missouri's plan, including market estimates. However, the examiner found "a public need for and benefit to be derived from" the proposed natural gas service.

Central Missouri wants a maximum of 4 MMcfd from Michigan Wisconsin in the third year of operation. Estimated initial cost of the distributor's system is $1.7 million, increasing to $2 million in the third year.

These 30-in. check valves from Frank Wheatley Pump & Valve are destined for compressor station manifold installations on Trans-Canada Pipe Lines system in Saskatchewan. The check valves have mechanisms for minimizing slam and controlling the clapper.

AT LAST YOU CAN BE SURE OF

POSITIVE DEW POINT READINGS



The DEWTECTOR developed and proved by UGC INSTRUMENTS takes dew point reading out of the category of "opinion and interpretation" of the individual using the instrument.

The DEWTECTOR—for the standard dew point instrument used throughout the natural gas industry—removes all guess-work. The DEWTECTOR optical system illuminates the mirror and magnifies the dew point to such a degree that all doubt is removed.

The DEWTECTOR self-contained light source permits dew points to be taken at night or under any adverse weather or enclosure conditions. The 16X magnification permits ready differentiation between hydrocarbon and water dew points and between water dew and ice points.

The DEWTECTOR is lightweight, easy to carry, simple to attach, requires little effort to operate. The results are

POSITIVE, REPEATABLE AND SUBJECT TO VERIFICATION.

LOW IN COST—SPECIAL PRICES ON ORDERS FOR FIVE OR MORE.

Address inquiries to:

UGC INSTRUMENTS

P.O. Box 1407 • Shreveport, Louisiana • Phone UN 1-4531-LD81

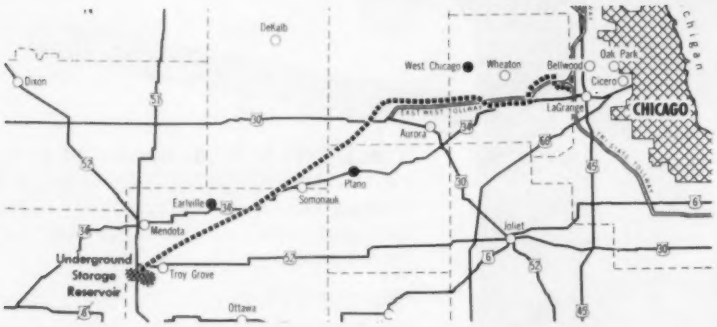
UGC INSTRUMENTS

A DIVISION OF UNITED GAS CORP.

DEWTECTOR

NI-Gas building

Work is progressing on Northern Illinois Gas Co.'s 75-mile line (see map) from Troy Grove underground storage reservoir to near La Grange. Construction is expected to be completed before the Oct. 1 target date. Initially, the line will transport up to 100 MMcfd from the storage reservoir to the heart of NI-Gas' distribution system. In addition, the line will provide gas service to the towns of Leland and Somonauk. Photo shows coating and wrapping operation on the 30-in. line.



NGPL must supply three distributors

FPC has directed Natural Gas Pipeline Co. of America to supply gas to three companies for distribution in towns in Iowa and Illinois (Docket G-12399 et al). The order affirms part of an earlier decision by a presiding examiner.

Iowa Power & Light Co., Des Moines, will get 1 MMcfd for three Iowa towns; Iowa Southern Utilities Co., Centerville, 3.6 MMcf for four Iowa towns; and Illinois Power Co., Decatur, 598 Mcf for three Illinois towns.

Last March, Examiner Costello approved an overall expansion program for NGPL. Part of his order required NGPL to supply gas to the three distributors. Later two of the distributors asked FPC to separate from the rest of the proceedings the noncontroversial matters involved in the requests for gas.

The parts of the proceeding still to be decided by FPC involve NGPL's plan to increase its system capacity by 185 MMcfd at a cost of $62.5 million. The facilities have already been built and are in operation under temporary certificates. Oral arguments got under way last month.

Sees delay in Canada-to-Calif. line

A. G. Bailey, president of Alberta Gas Trunk Line, said construction will not get under way this summer on the export line to the U. S. Procedural difficulties and "unexpected and very stubborn opposition" have delayed plans for the line which would carry gas to Alberta & Southern Gas Co. and Westcoast Transmission.

Opposition has come in California before the PUC and in Washington before the FPC.

Bailey said loss of the 1960 construction season would not necessarily push completion of the line beyond the November 1961 target date. It might, however, result in a crash construction program which would increase construction costs materially.

TGT gets permanent okay

FPC Examiner Woodall filed a decision giving Tennessee Gas Transmission a permanent certificate to increase gas deliveries to existing customers (Dockets G-18877 et al). No new facilities are involved.

Also approved was TGT's abandonment of transportation service to Niagara Gas Transmission Ltd. of Canada. TGT can use the facilities on the U. S.-Canadian border near Niagara Falls for emergency exchange of gas with Trans-Canada Pipe Lines Ltd.

Other matters disposed of by the decision: denial of TGT's temporary winter service proposal for using excess storage gas; approval of natural gas sales by two of TGT's customer companies and authorization for one other customer to build new facilities; and a requirement for TGT to supply gas to two utilities.

Can't sell gas for generating plant

Southern Georgia Natural Gas Co.'s plan to sell gas to the City of Thomasville, Ga., for its electric generating plant was turned down by FPC (Docket G-17568).

Thomasville has bought gas from South Georgia since 1955 for its local distribution system. Some of this gas originally was used in the power plant. However, in June, 1958, Thomasville decided to use coal. This was after South Georgia increased gas rates from 32 cents to 36 cents per Mcf. Then, in September, 1958, Thomasville and South Georgia signed a new agreement under which interruptible gas would go for 34.5 cents for use in the power plant.

FPC turned down South Georgia's contention that this service was properly initiated under the original FPC certificate. Since the new contract changed nothing but the rate, South Georgia felt that FPC had no jurisdiction to regulate direct sale rates.

The commission held, however, that it has control over the "transportation" of gas for direct sales, although not over the sales themselves. It has the responsibility to require a pipeline to show that the rate at which it proposes to make a direct sale is at or above a "compensatory" level, to ensure that the sale will recoup a proper proportion of system costs.

Quick quiz tells whether you're paying more than you need for Gas Distribution Pressure Recorders

YES	NO		
☐	☐	Can you get easy-to-read 12" charts without paying extra?	from Foxboro you can!
☐	☐	Can you get a fully weatherproof case without paying extra?	from Foxboro you can!
☐	☐	Can you get a 100% submersible case for flooded areas?	from Foxboro you can!
☐	☐	Can you get one standard recorder for both permanent and portable applications?	from Foxboro you can!

A check in the "NO" column means your Foxboro field engineer can save you money —why not call him? The Foxboro Company, 348 Norfolk St., Foxboro, Mass.

FOXBORO
REG. U.S. PAT. OFF.

FPC turns down Florida rate filing

FPC turned down rate increase filings by Coastal Transmission Corp. and Houston Texas Gas & Oil Corp., both of St. Petersburg, Fla.

The filings—covering a $3.7 million increase per year — were termed "inconsistent" with conditions contained in the companies' 1956 certificates.

Those conditions called for a cost-of-service form of tariff for Coastal and separation of Coastal's rate schedules for gas sales and transportation service to Houston. Also called for was a rate of return for Coastal in the cost-of-service formula to be based on the combined return of Coastal and Houston, but not more than 6 per cent. Houston's rates were also to be based on a return of not more than 6 per cent.

Coastal's desired increase in rates for sale of gas amounted to $1.4 million, or 11.1 per cent. Transportation rate totaled $911,970, or 35.4 per cent. Of Houston's increase, about $407,750 applied to sales for resale, and $933,130 to its transportation of gas for Florida electric companies.

FPC hears Northern, Michigan plans

Hearings are underway on expansion plans of Northern Natural Gas Co., Omaha, and Michigan Wisconsin Pipe Line Co., Detroit. (See March GAS, p. 171.) Total cost of the projects: $46 million plus.

In one of its applications (Docket G-20571) Northern proposes to sell 75 MMcfd to Michigan Wisconsin, a new customer. Involved in the $24.9 million job is some 236 miles of line in Kansas, Nebraska, Iowa, Illinois and Wisconsin. Compressor additions would total 14,050 hp. Deliveries would be made near Janesville, Wis.

Northern's Docket G-20570 covers 124 miles of line and 17,360 compressor hp costing $16.6 million. The line and station additions will be in Oklahoma, Kansas, Nebraska, Iowa, and Minnesota. With them, Northern can sell an additional 73.8 MMcfd to existing customers.

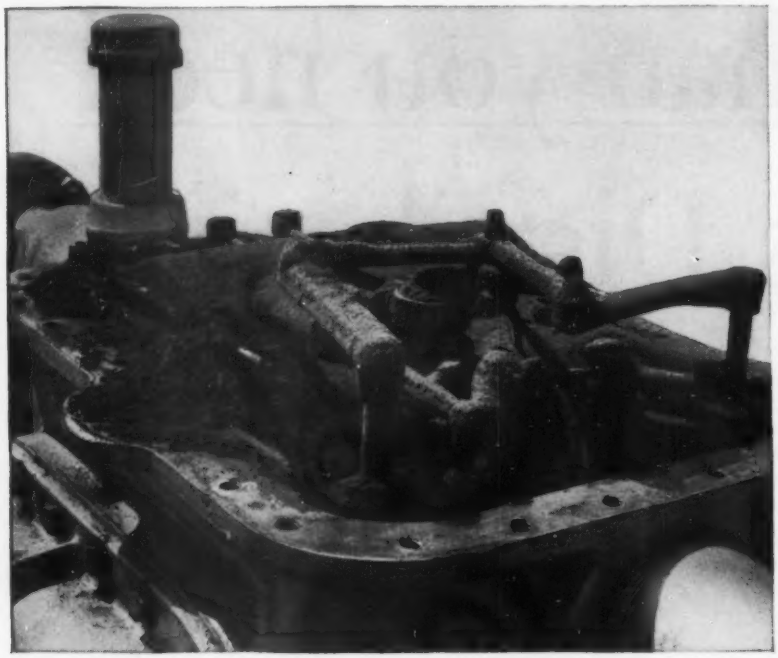
The smallest of Northern's projects, covered in Docket G-18756, involves $673,000. Existing customers will get an additional 24.9 MMcfd.

Michigan Wisconsin will have to build about 29 miles of line and add 3000 compressor hp in Illinois, Michigan, and Wisconsin. The $4.3 million job will enable it to receive the 75 MMcfd from Northern.

FPC calls Northern on accounting practices

Northern Natural Gas Co. has been accused of violating the Natural Gas Act. FPC said the company failed to keep its accounts as required by the commission's uniform system of accounts for natural gas companies.

FPC said Northern incorrectly charged to its Account 507—which includes amounts properly chargeable to gas operations—the amounts it paid to a subsidiary covering tax losses. This is contrary to the Uniform System of Accounts, said FPC. Account 507 should include only actual taxes and not the assignment of negative or credit amounts for income taxes to a subsidiary.



Dirty Gas won't clog your meters when you use BLAW-KNOX Gas Cleaners

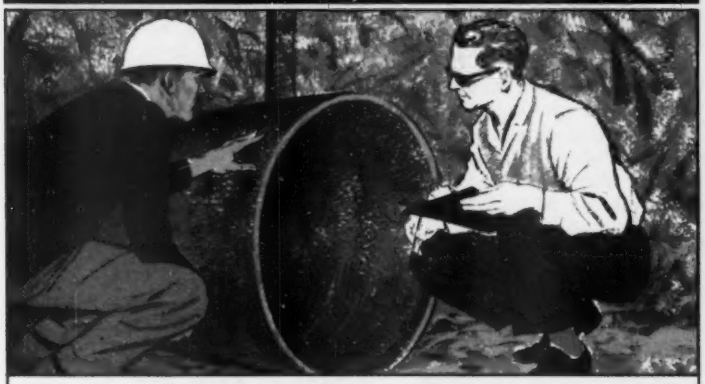
This meter was plugged by dirt that could have been trapped by a Blaw-Knox Gas Cleaner. Dirty gas clogs lines, sandblasts regulators, wears down compressors. With Blaw-Knox Gas Cleaners you get trouble-free fuel that cuts your costs while it builds highest customer relations. Send for Catalog 387. Buflovak Equipment Division, 1547 Fillmore Avenue, Buffalo 11, New York.

Buflovak Equipment Division

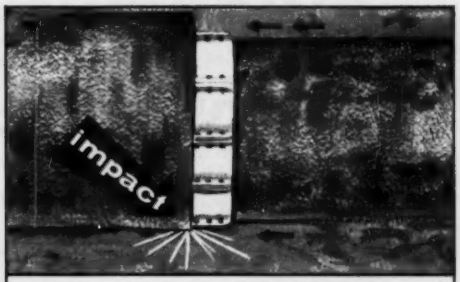
BLAW-KNOX

NEWS FROM DOWN THE LINE!

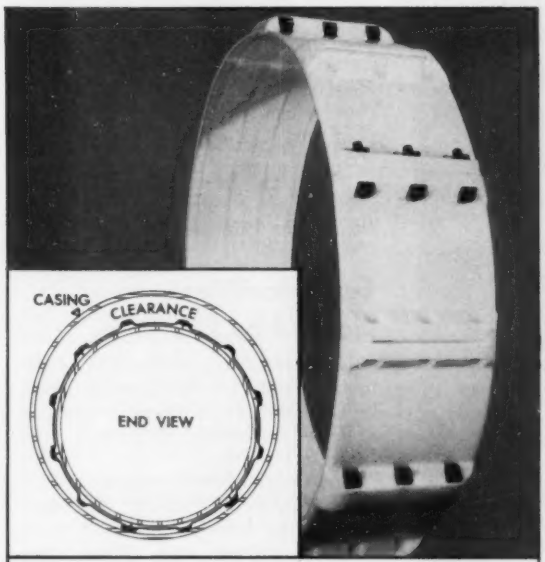
WmSON BIG-INCH M-2 THINSULATORS® MEET RUGGED TEST IN NEW JERSEY TURNPIKE CROSSING



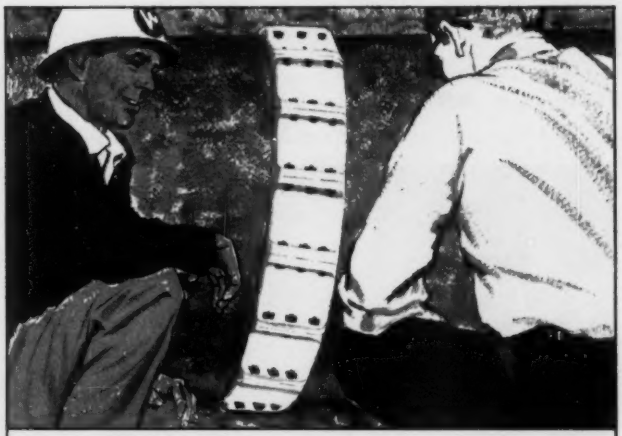
❶ "We'll pull the 36" drag section through this 275' casing. The casing has a slight dog-leg in the center which will make the pull a really tough test of the THINsulators."



❷ "M-2 THINsulators are high-density polyethylene products, resistant to fracture under tremendous impact. Most other plastic insulators are fiberglas reinforced polyesters that don't have the impact resistance, so breakage rates are high."



❸ "The high density polyethylene gives the M-2 such strength it can be made more compact than other insulators, allowing more clearance. It's flexible, so it conforms to the pipe for uniform coating loading . . . and the low coefficient of friction makes it slide like it's greased."



❹ "The tremendous force of the pull caused the lead THINsulator to absorb most of the shock. It twisted slightly but remained intact. All hands agree this is the best plastic casing insulation they have used."

❺ "Consider the economy of M-2 THINsulators. They cost no more than other plastic insulators, and breakage is **practically unknown.** Bend 'em, beat 'em, you can't break 'em."

T.D. Williamson, Inc.

P. O. BOX 40 • TULSA 2, OKLAHOMA

REPRESENTATIVES AROUND THE WORLD

Write Dept. C for Technical Bulletin on the M-2 THINsulator

Texas Gas launches storage program

Texas Gas Transmission Corp., Owensboro, Ky., plans to develop the West Greenville gas field as a natural gas storage reservoir.

Docket G-19510 calls for construction of 29.5 miles of 12-in. line from the West Greenville field in Muhlenberg, Ky., to Texas Gas' mainline facilities near Slaughters, Ky. Also planned are a 1760-hp compressor station, a dehydration plant and a meter station. These facilities will cost $2.5 million. Total cost will be $3.5 million, because Texas Gas plans to buy the rights and interests to West Greenville from Western Kentucky Gas Co.

Later, Texas Gas will develop the storage pool to an estimated peak-day deliverability of 85 MMcf. When 21.5 MMcf of peak-day withdrawal capacity is reached, Texas Gas will sell to Western Kentucky all the rights and interests it has in the Hickory School and Grandview storage fields. These two fields have a combined peak-day withdrawal capacity of 21.5 MMcf.

Noise control studied

The second volume of a three-part handbook on noise control at pipeline regulating and metering stations has been published.

The 200-page technical report is based on studies conducted by the Southwest Research Institute under AGA's PAR plan. Covered are sources of noise, accepted methods for sound and vibration control, a listing of materials and methods for acoustical treatment, results of field and lab noise suppression studies, and practical design considerations.

The third volume, slated for 1961 publication, will deal with compressor station and blow-off noise abatement.

Copies of Volume II, "Noise Abatement at Gas Pipeline Installations—Noise Suppression at Pressure Regulating and Metering Stations," are available at $3.50 each from the AGA.

rugged cross-country pipe line *fully protected*

To be practical, performance life of inaccessible installations such as this must be measured in decades. That's why Hill-Hubbell was chosen to apply optimum corrosion protection to this and many similar lines throughout the country.

On your next job be assured of long service life — specify Hill-Hubbell, the name synonymous with quality in mill coated-and-wrapped pipe.

Specify Hill-Hubbell wrapped pipe on your next job . . .

HILL·HUBBELL

DIVISION OF GENERAL PACIFIC CORP

3091 MAYFIELD RD. · CLEVELAND 18, OHIO · YELLOWSTONE 2-7535

Cities Service can use Alden storage field

Cities Service Gas Co. has FPC permission to use its Alden, Kan., underground gas storage field for the 1961-62 winter season. FPC approved (Docket CP60-32) the expenditure of $4.3 million for new facilities at the field. Cities Service also will increase the capacity of its Hugoton-Kansas City 26-in. line.

Alden field work includes well work and pipeline installation estimated to cost $1.7 million. Two 3600-hp stations will boost the 26-in. pipeline. Two other stations will have turbo-charging units added.

New accounting system effective next Jan. 1

FPC's general revision of its Uniform System of Accounts for Natural Gas Companies becomes effective next Jan. 1.

The completely revised system of accounts for gas companies is published as Part II of the Federal Register and is available for 15 cents a copy from the Superintendent of Documents, Government Printing Office, Washington 25.

FPC plans to publish the revised system of accounts in pamphlet form later this year.

Texas facilities planned by Northern

Northern Natural Gas Co. is going to build new facilities in Texas to take gas from three producing areas — Hansford, Ochiltree, and Roberts counties.

The Omaha-based company asked FPC (Docket CP60-39) for permission to build a 7000-hp compressor station and about 40.8 miles of gathering lines. Also covered in the $5.3 million project is an additional 50 MMcfd in dehydration capacity and 100 MMcfd in hydrocarbon extraction capacity at its Spearman plant.

Equitable project okayed

Equitable Gas Co., Pittsburgh, can build about 58 miles of line at a cost of $5.3 million (Docket CP-60-4). The company plans about 31.7 miles of 16-in. and 26.7 miles of 20-in. line in West Virginia and Pennsylvania. Equitable's overall system capacity will be increased by 76 MMcfd.

FPC hears Montana-Dakota project

FPC is hearing Montana-Dakota Utilities Co.'s plan to spend $1.7 million on a 51-mile line (CP-60-56).

The line consists of a 22.7-mile section of 16-in. to replace a smaller diameter line in Fallon county, Mont. and Golden Valley county, N. D. In addition, 7 miles of 10¾-in. and 21.5 miles of 12¾-in. will parallel an existing line in Morton county, N. D. and Carbon county, Mont. An 880-hp addition will be installed at Cabin Creek station in Fallon county.

Protective coating makers merge

Coast Paint & Lacquer Co., Houston, has merged with Reliance Varnish Co., Louisville, Ky. Expansion plans were announced for Coast's Houston plant at the same time. Production facilities and personnel will increase 40 per cent within the next 18 months.

Reliance, headed by board chairman H. C. Grawemeyer and president Ben Robertson Jr., produces wood finishing materials, lacquers and decorative metal coatings. Coast Paint is headed by Kenneth W. McDowell, chairman. His company produces protective coatings for gas transmission lines.

Under the new set up, McDowell will become president of the Coast Paint & Lacquer division of Reliance, with Carl Seefeld as vice president in charge of sales.

Coast Paint is the parent company of Copon Associates Inc., the the name given to corrosion-resistant coatings applied to the inside of gas transmission lines.

New firm organized

A new engineering service firm is designing and developing custom components of rubber, plastics, and metals for specific engineering projects.

Principals of Vanguard Engineers Inc., located in Houston, are associated with F. H. Maloney Co.

Maloney pioneered in the manufacture of pipeline spheres, expediting the complete automation of gas, crude, and product pipeline systems. Vanguard, working from a Shell Pipe Line Co. concept, designed and developed the automated system now offered by Maloney internationally.

BONNEY SWEEPOLETS Pat. Pend. ®

---are SWEEPING the pipeline industry

The Bonney Sweepolet is an integrally reinforced insert butt welding pipe fitting specially designed for stress free branch connections on high pressure pipelines.

WRITE FOR CATALOG S-1A

BONNEY FORGE and Tool Works

ALLENTOWN, PENNSYLVANIA

BONNEY

FPC reverses East Tenn. order

An FPC presiding examiner has decided that East Tennessee Natural Gas Co., Knoxville, can provide additional gas service to Middle Tennessee Utility District, Smithville (Docket G-19530).

Earlier, Presiding Examiner Purdue denied the proposed service. However, the commission reopened the proceeding for additional evidence. After the latest hearings, the examiner concluded that the new service should be authorized.

FPC names new staffer

John R. LaCamera has been named regional accountant in FPC's San Francisco regional office. He succeeds the late Roland W. Zell.

Opens California office

H. Zinder & Associates has opened a San Francisco office. The California branch is under the supervision of Sol Schultz, partner and manager of the firm's Seattle office.

Big Lake Erie find

Long Point Gas & Oil Ltd. has uncovered "one of the biggest natural gas finds" on Lake Erie. R. E. Liptrott, a director of the company, said the well has an average potential of 6.1 MMcfd.

Beaird acquires Maxim

J. B. Beaird Co. Inc. has added the manufacture and distribution of Maxim Silencers and heat recovery units to its line. Acquisition of the Maxim products was made possible through the recent purchase of the Maxim division from Emhart Manufacturing Co., Hartford, Conn., by American Machinery & Foundry Co. Beaird is a wholly owned subsidiary of AMF.

Names resale agent

Minneapolis Honeywell's Industrial Products group in Philadelphia has been named resale agents by Rotron Controls Corp., Woodstock, N. Y. Honeywell will handle Rotron's line of vortex-velocity type flowmeters, gas densitometers, and accessories with Honeywell instrumentation systems.

GAS Pipeline People

WILLIAM R. CLARK is the newly appointed assistant chief geologist for Natural Gas Storage Co. of Illinois. Clark has been district geologist since 1955, headquartering at Joliet.

ROBERT O. ANDERSON, president of Hondo Oil & Gas Co., Roswell, N. M., has been elected to the board of directors of Northern Natural Gas Co., Omaha. He succeeds FRED C. KOCH, who has resigned.

JAMES LEBLANC has been promoted to Houston district landman by Trunkline Gas Co. LeBlanc's former job was scout in the Lafayette, La. district office.

W. D. WALSER, vice president of Tennessee Gas Transmission Co., Houston, has been elected a director of the Controllers Institute of America.

Make-um-War on CORROSION

with MIDWESTERN'S GLASFAB® BRAND Pipe Line Products

"GLASFAB" . . . an ideal handwrap for pipe joints, extensions, hot spots, holidays . . . with either hot or cold applied coatings. Ideally suited to machine wrapping due to its high tear strength.

GLASKOTE . . . for application without a hot dope pot. Specially designed for field welds and emergency repairs. May be used on any above or below ground installation.

SPEEDWRAP . . . a prefabricated pipe joint cover designed for use as either hot or cold coatings for field welds and patching. Widths of 18" and 24" are pre-cut in lengths to fit the size pipe being wrapped.

SPEEDKOTE . . . a quick-set asphalt with excellent adhesive properties, high dielectric strength and good soil and mar resistance. May be brushed, troweled or sprayed on pipe.

Ask a Midwestern representative about the "extra" protection qualities of "Glasfab" products. Nine Midwestern offices are located throughout the United States and Venezuela to serve your corrosion needs quickly, efficiently.

MIDWESTERN
PIPE LINE PRODUCTS CO.
4645 Southwest Blvd. Tulsa, Okla. HI 6-6144
Cable Address: Mid Pipe

branch offices
- Houston, Tex.
- Chicago, Ill.
- St. Petersburg, Fla.
- Pittsburgh, Pa.
- Oklahoma City, Okla.
- Des Moines, Ia.
- New York, N.Y. (export)
- Caracas, Venezuela

R. M. Gabey
Bristol

Henry K. Bacon
Bristol

Karl Young
Bristol

KARL YOUNG JR. and HENRY K. BACON have joined the Bristol Co., Waterbury, Conn. as full-time instructors in the education department. Bristol's newly appointed export manager is R. MELVIN GABEY, formerly field sales engineer in the Dayton, Ohio office.

CHARLES W. GANZEL has been appointed manager of pipe and tube sales of Bethlehem Steel Corp. He has been manager of sales for Bethlehem's Cleveland district since 1956. Ganzel succeeds EDWIN A. BUXTON, retiring after more than 43 years with the company. FREDERIC W. WEST JR. succeeds Ganzel in the Cleveland post. Succeeding West as assistant manager, plate sales division, is WILLIAM E. HOTALING.

JOHN A. MCGUIRE is board chairman of Three States Natural Gas Co., Dallas. President of the company since 1952, McGuire is succeeded by WILLIAM H. HUDSON. LEE VANATTA, a Three States vice president, was elected to the board of directors.

ARTHUR F. BAKER has been named comptroller of W-K-M division of ACF Industries Inc., Houston. He succeeds C. M. WHITE JR., who has transferred to the comptroller's staff of ACF in New York.

INTERURBIA

Growth Market for the Gas Age

Concentrated in the New York-Newark Interurban complex are more natural gas consumers than in any single *state* of the union. Not satisfied to remain America's Number One Market for consumer goods and services, Interurbia expects to grow another 10% this year.

Such a unique combination of growth and stability means unequaled security for gas producers supplying this modern City State of the Gas Age. Via Transco, producers in Texas and Louisiana can tap the market where the most people are.

TRANSCONTINENTAL Gas Pipe Line Corporation

R. A. STUMM has resigned as vice president and board chairman of Southern Pipe division, U. S. Industries Inc., Azusa, Calif. D. A. STROMSOE, president of Southern Pipe since 1957, will continue to actively operate the division. As founder of the Southern Pipe & Casing Co. at Azusa in 1932, Stumm served as its chief executive for 27 years, for the past years as its board chairman.

E. S. TURNER was named northwest regional marketing manager for Southwestern Industrial Electronics Co., a division of Dresser Industries. Turner's regional office is in Colorado Springs.

FRANK D. HANNELL is manager of product production engineering for mobile communication equipment made by General Electric, Lynchburg, Va. GEORGE M. DEWIRE is manager of personal pocket radio communications.

Clark Bros. Co., Olean, N. Y., has made the following appointments: STEWART L. BABBITT from service manager in Houston to sales engineer in the same office;

S. L. Babbitt
Clark

G. M. Woodman
Clark

G. M. WOODMAN to small engine salesman in Houston; C. R. APITZ, senior sales engineer in Houston; and F. J. SHAW, sales engineer for the Corpus Christi area.

VIRGIL A. BRECHEEN is assistant tax commissioner in Pioneer Natural Gas Co.'s general office in Amarillo. With the company since 1945, Brecheen most recently was assistant manager of the Lubbock distribution office.

DONALD REX MANSFIELD has rejoined Holan Corp. of Georgia as a sales representative after a two-year tour of duty with the Army. He will represent Holan in Florida, Alabama, and Mississippi.

regulatory • *Cont'd.*

from page 20

quick conversion to emergency status.

The atrophy of any segment of the national energy base is of critical importance to our defense position. One of the primary objectives of a National Fuels Policy study would be to measure the existing balance of our fuels economy in the light of national security requirements.

A study of the comparative percentage increases in 1957 annual production over 1956 indicates that the U. S. must act quickly to assure maintenance of its advantage over Russia:

	United States	*Soviet Union*
Oil	*Minus fraction of %*	*Up 17%*
Coal	*Minus 2%*	*Up 8%*
Natural Gas	*Up 5½%*	*Up 48%*
Total Electric Power	*Up 4½%*	*Up 22%*

Municipalities and Private Utilities . . .

Experienced Engineers

Skilled Installation Crews

Top Quality Material

Save Money With CPS Turnkey "Packaged" Corrosion Prevention

Cathodic Protection Service's years of experience, trained installation crews and highest quality materials assure you of *reduced "unaccounted for" loss, lower maintenance costs* and *higher profits.*

Let one of our experienced engineers show you how Cathodic Protection Service can solve your individual corrosion problems. Call, wire or write the CPS office nearest you.

Cable Address — CATPROSERV

CPS **cathodic protection service**

P. O. BOX 6387 HOUSTON 6, TEXAS JAckson 2-5171

CHICAGO
122 S. Michigan Blvd., Rm. 964
WEbster 9-2763

NEW ORLEANS
1627 Felicity
JAckson 2-7316

TULSA
4407 S. Peoria
RIverside 2-7393

CORPUS CHRISTI
1620 S. Brownlee
TUlip 3-7264

ODESSA
5425 Andrews Hwy.
EMerson 6-6731

The U. S. has authorized the expenditure of over $800 million in the past six years on its civilian nuclear energy program, while sometimes overlooking the urgent problems of conventional fuels industries. Although the early prospect of peacetime atomic energy has been held out to the public a recent report of the International Atomic Energy Agency concluded that nuclear power for practicable civilian use is still many years away. The report stated:

"The technology of power reactors is still at a relatively early stage, and the cost of nuclear power production, according to present estimates, has not yet been reduced sufficiently to make it economically attractive except under certain technical and economic conditions."

There is no pressing need for the speedy development of civilian atomic energy. This energy, used for ordinary purposes, is no better than energy from oil, gas, or coal and the reserves of coal are enough to supply the nation's needs for several hundred years.

While the U. S. will necessarily press forward to develop peacetime nuclear power in the years ahead, the need to coordinate this program as part of an over-all energy resources plan is becoming increasingly apparent.

Nor is there any logical foundation for the fears expressed that the result of the inquiry might be Governmental controls over the fuels industries, including end-use controls. From the attitude of the oil and gas industries with regard to Congressional study, the uninformed might conclude that the energy industries are completely free of regulation, and that the coal industry seeks to bring government, for the first time, into this field. Actually, there already is extensive Federal and state regulation directly affecting the end uses of oil, gas, electricity, atomic energy, and coal.

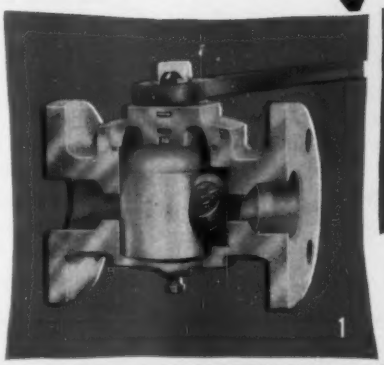
The Federal Power Commission with the Natural Gas Act regulates the gas industry. The oil industry is regulated by the rate-fixing powers of the Interstate Commerce Commission and by the Interstate Oil Compact. The Interstate Commerce Commission regulates freight rates and these have an effect upon the consumption of coal. The Atomic Energy Commission has sole authority over the regulation of civilian nuclear power development.

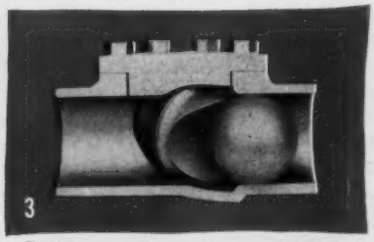
So extensive is Government regulation in the fuels economy picture that one oil-industry spokesman, the official publication of the Texas Independent Producers and Royalty Owners Association, looks upon the fuels policy study as a means of curtailing and limiting "government intervention." The TIPRO Reporter stated in its edition of September-October, 1959:

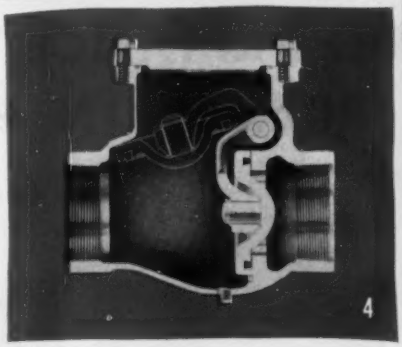
"Certainly no one can deny there are glaring problems which merit attention and which a proper fuels policy might correct. For example, a realistic fuels policy dictated by Congress might be a means of removing unjustified FPC utility regulation of natural-gas production . . ."

With this information about the coal industry's objectives, the gas companies can act to protect their future interests. ■

200,000







SINCE 1916

FRANK WHEATLEY
PUMPS & VALVES
TULSA, OKLAHOMA

P. O. BOX 1948
TULSA, OKLAHOMA
LU 4-5175

SEE OUR CATALOG IN COMPOSITE CATALOG
DO SEND FOR A COPY

That's the number of Frank Wheatley valves doing specialized jobs in the petroleum, petrochemical, chemical, pipeline, and processing industries around the world. (1) The PLUGAROO — non-lubricated combination plug and check valve; (2) The SLAM-MINIMIZER — slam-free check valve for high pressure lines; (3) The SPHERE-CLEAR — check valve for lines utilizing ball-marker for interface or batch change; (4) The Synthetic Seal CHECK VALVES — ranging in size from 1" to 36" with or without removable seats. There's a FRANK WHEATLEY Valve to fit your requirements . . . so write today for details.

YOUR SUPPLY STORE **SHOULD** HAVE THEM

GAS CONFERENCE

Continued from page 58

total gas volume moving in interstate commerce throughout the United States, anything relating to gas prices, regulation philosophy, etc., in California will be reflected by El Paso and Transwestern to your supplying pipeline(s) and should, therefore, be of concern to you. Since the departure of manufactured days, few if any gas companies are isolated from developments over the entire gas industry.

Similarly, the vice versa is true. Moves made by your gas company or in your state relating to the gas industry will sooner or later be reflected in California and in other gas consuming states.

Secondly, this conference shows the need for public relations people to get to work and provide realistic programs for telling the plain truth to local and state officials about the entire gas industry, in addition to just about their own companies. It is complex enough to understand the industry from within the thing. It must be awfully difficult for the public and officials of any level of government to comprehend. It was obvious to me that in California, at least, some elected and appointed people in state government know practically nothing about our industry, its operations, problems, and relations with consumers. I feel they would welcome impartial appraisals of the gas industry's accomplishments and problems, as well as basic education on the gas business.

So I will say to all my public relations friends: Here, sports, I give you some really virgin territory for application of your science of keeping people correctly informed—the ever-changing officials of state governments. Seriously, this may be an area for increased attention within your state. State officials and the public deserve to be kept informed about all facets of the gas industry, not just those developments that will result in some "good publicity" for your company on the local level.

Lastly, I am sure that conferences such as the one held in California will spread in days and years to come. There will probably be more of them in California, and other states will very likely hold some. I think we will all welcome the opportunity to have more interest shown in our industry by the public and our officials.

I am sure that all most gas companies ask is true concern and a valid opportunity from such meetings or inquiries. They can be obtained. An active political life on the parts of gas company managements and employees is an effective way of assuring these factors.

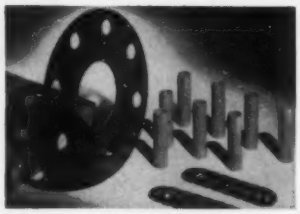
Politics can be planned and played against the gas industry. To counter this, the gas industry can bring its facts and pleas to the ultimate controllers of politics, the voters, most of whom are its customers. ■

PRECISE PERFORMANCE DEMANDS PRECISION PRODUCTS

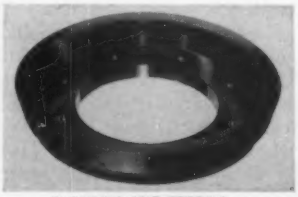
THE TRANSWESTERN PIPELINE FROM TEXAS TO CALIFORNIA WILL DEPEND ON THESE PRECISION PRODUCTS MANUFACTURED BY...

CATHODIC PROTECTION

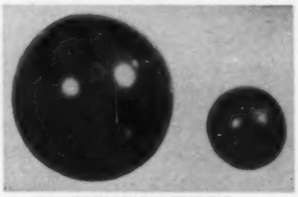
CATHODIC PROTECTION



CATHODIC PROTECTION



CLEANING AND TESTING



HYDROSTATIC TESTING

F. H. Maloney COMPANY

PRECISION IN RUBBER • METALS • PLASTICS

2301 TEXAS AVENUE • HOUSTON, TEXAS

CHICAGO • LOS ANGELES • PITTSBURGH • TULSA

COST OF GAS . . . *Con't from page 67*

$$DD_1 - DD_2 = 60\,(T_1 - T_2)$$

since $x = A + B_1 T_1 - B_2 T_2 - C_1 DD_1 + C_2 DD_2$

and $DD_1 = 60T_1 - 60T_2 + DD_2$

therefore

$x = A + B_1 T_1 - B_2 T_2 - C_1 (60T_1 - 60T_2 + DD_2) + C_2 DD_2$

collecting terms:

$x = A + (B_1 - 60C_1) T_1 + (60C_1 - B_2) T_2 + (C_2 - C_1) DD_2$

differentiating:

$$\frac{\partial x}{\partial T_1} = 0 = B_1 - 60C_1 \text{ (no solution)}$$

$$\frac{\partial x}{\partial T_2} = 0 = 60C_1 - B_2 + (C_2 - C_1) D_2$$

or $$D_2 = \frac{B_2 - 60C_1}{C_2 - C_1} = \frac{25{,}920 - 60\,(226.8)}{787.5 - 226.8} = 22.0 \text{ days}$$

The mean temperature at which there are 22.0 days colder is 22.4 deg F, and there are 157 degree days colder than this temperature. Between 37.4 deg F and 22.4 deg F there are 900 degree days which is 60 days use of the demand, 37.4 deg F less 22.4 deg F. Therefore, the most economical firm gas demand would be:

$$450(65 - 37.4) + 8{,}000 \text{ or } 20{,}420 \text{ Mcf}$$

The most economical amount of natural peaking gas would be 15 times 450 or 6750 Mcf daily and 405,000 Mcf annually; 450 times 157 or 70,650 Mcf of make gas would be required when the total sendout exceeds 27,170 Mcf. Since the firm purchase gas load factor is limited to 270 days use, the most economical amount of seasonal gas that could be sold would be:

$$4{,}737{,}500 - 121{,}500(37.4) + 420(1{,}057)$$
$$\text{or } 637{,}340 \text{ Mcf}$$

The total cost of all gas would then be:

$$3{,}677{,}400 + 16{,}200(37.4) - 25{,}920(22.4) - 226.8(1{,}057)$$
$$\text{or } \$3{,}586{,}582$$

By comparing these two examples, it can be seen that this distributor could save $177,504 for a heating season if he were to use the pipeline peaking service. However, these savings cannot be realized unless the seasonal sales are reduced from 700,000 to 637,340 Mcf.

Conclusion

Since the use of partial derivatives will determine the minimum point on any curve regardless of the number of variables, it can be seen that all economic gas balance problems can be readily solved. These balances could include purchased gas from any number of pipelines, and/or peaking gas at various costs, flat or two-part, and/or seasonal sales at different rate schedules. If a careful analysis of your sendout is made, you will find substantial dollar savings in your overall gas costs. Here is a complete procedure to follow:

1. Analyze the weather
2. Equate the sendout to the weather
3. Price the various volumes within the sendout
4. Calculate the minimum cost of gas
5. Determine the economic gas volumes ■

check the valve

that doesn't chatter

Check the Daniel Piston Controlled Check Valve for quiet efficiency in preventing flow reversal. Choose from stock in sizes and types covering a wide range of both compressible and non-compressible fluid services. Patented, free-floating piston design eliminates chattering and minimizes pulsation. Available in carbon or cast alloy steels with stainless trim, or with hard-faced internals for mud-line service. Up to 10,000 lbs. A.S.A. ratings.

DANIEL

ORIFICE FITTING COMPANY
INCORPORATED

Houston, Texas
P. O. Box 19097
HOmestead 5-3451

Los Angeles, California
3352 Union Pacific Ave.
ANgelus 9-9206

Write for Daniel Catalog Section "H"

134

— INDEX TO ADVERTISERS —

This advertisers' Index is published as a convenience and not as part of the advertising contract. Every care will be taken to index correctly. No allowances will be made for errors or failure to insert.

ACF Industries Inc., W-K-M Div. 130, 131
Adams Pipe Repair Products —
Air Maze Corp. —
Allied Chemical, Plastics & Coal Chemicals Div. 12
Allis-Chalmers Mfg. Co. —
American Cast Iron Pipe Co. 44
American Meter Co. 79, 81
American Meter Co., Reliance Regulator Div. Second Cover
American Recording Chart Co. —
Apco Div., Textron Inc. —
Aqua Survey & Instrument Co. 102
Arkla Air Conditioning Corp. 51
Arno Adhesive Tapes Inc. 96

Barber-Greene Co. —
Baso Inc. —
Beaird Co., Inc., J. B. 133
Berry Hydraulics Div., Oliver-Tyrone Corp. 97
Bethlehem Steel Co. —
Bilco Co. 86
Black, Sivalls & Bryson, Inc.—Third Cover
Blaw-Knox Co. 142
Bonded Products Inc. —
Bonney Forge & Tool Works 145
Borg-Warner Corp., Marbon Chemical Div. 33
Bristol Co. 132
Busada Supply Co. Inc. 101

Cal-Metal Pipe Corp. of Louisiana —
Capitol Mfg. Co. 21
Cast Iron Pipe Research Assn. 34, 35
Cathodic Protection Service 148
Chaplin-Fulton Mfg. Co. 16
Charles Machine Works 80
Chase & Sons Inc. —
Chemetron Corp., Tube Turns Div. 124, 125
Chevrolet Motor Div., General Motors Corp. 49
Clark Bros. Co., Dresser Industries, Inc. —
Cleveland Trencher Co. 42
Cooper-Bessemer Corp. —
Corrosion Services Inc. 78
Cosa Corp. 96
Crose-Perrault Equipment Corp. —

Daniel Orifice Fitting Co. 151
Darling Valve & Manufacturing Co. —
Davey Compressor Co. —
Davis Emergency Equipment Co. —
Davis Manufacturing Inc. —
Deere & Co. —
Dollinger Corp. —
Dover Corp.
Dura-Vent Div. —
Peerless Mfg. Div. —
Dresser Industries, Inc. —
Clark Bros. Co. —
Dresser Manufacturing Div. 84, 85
Roots-Connersville Blower Div. 43

Eastman Chemical Products 1
Ebasco Services, Inc. 30
Electro Rust-Proofing Corp. —
Empire Stove Co. —

Fenix & Scisson Inc. 101
Fisher Governor Co. 18, 19
Fisher Research Laboratory, Inc. —
Ford Motor Co.
Tractor & Implement Div. 37, 38
Truck Div. —
Foxboro Co. 141

Garrett Oil Tools, Inc. 137
Gas Equipment Manufacturers —
General Controls 41
General Motors Corp., Chevrolet Motor Div. 49
Goodrich Chemical Co., B. F. —
Grabler Manufacturing Co. —
Grayson Controls Div., Robertshaw-Fulton Controls Co. 75, 76
Grove Valve & Regulator Co. 52

Handley-Brown Co. —
Harco Corp. —
Hays Manufacturing Co. 88
Heath Survey Consultants Inc. 100
Hill, Hubbell Co. 98, 102, 144
H & M Pipe Beveling Machine Co. —
Holan Corp. —
Homestead Valve & Manufacturing Co. 29

Ingersoll-Rand Co. —
International Business Machines —

Jaeger Machine Co. —
Johns-Manville Corp. 134, 135
Johnson-Williams Inc. —
Jones & Laughlin Steel Corp. —

Ka-Mo Tools Dept., Kwik-Mix Co. 5
Koenig Iron Works, Inc. —
Koppers Co., Inc., Metal Products Div. —
Kraloy Plastic Pipe Co., Inc. 89
Kwik-Mix Co., Ka-Mo Tools Dept. 5

Lancaster Meter Parts Co. 82
Latex Construction Co. 127
Ledeen Inc. 4
LimiTorque Corp. 14
Lone Star Steel Co. 3

Maloney Co., F. H. 150
Marbon Chemical Div., Borg-Warner Corp. 33
Maxitrol Co. 45
May Products, Inc. —
McCabe-Powers Body Co. 7
Midwest Piping Co., Inc. —
Midwestern Pipeline Products Co. 146
Minneapolis-Honeywell 26, 27
Motorola Communications & Electronics, Inc. 129
Mueller Co. 24, 25

National Supply Co. —
National Tank Co. —
National Tube Div., U. S. Steel Corp. 50
Natural Gas Odorizing Inc. —
Nicolet Industries Inc. —
Nordstrom Valve Div., Rockwell Manufacturing Co. 56, 57
Norton-McMurray Manufacturing Co. 74

Oliver-Tyrone Corp., Berry Hydraulics Div. 97
Oronite Chemical Co. 9

Parsons Co. —
Peerless Manufacturing Co. 22
Peerless Mfg. Div., Dover Corp. —
Philadelphia Gear Corp. 14
Pipe Line Service Corp. 39
Polyken Products Div., Kendall Co. 46, 47
Production Plating Works —
Protecto-Wrap Co. —

Radiator Specialty Co —
Reed Manufacturing Co. 87
Reliance Regulator Div., American Meter Co. Second Cover
Republic Steel Corp. —
Reynolds Gas Regulator Co., Inc. 99
Ridge Tool Co. 83
Robertshaw-Fulton Controls Co. Grayson Controls Div. 75, 76
Rockwell Manufacturing Co.
Gas Products Div. Front Cover
Instrument Div. —
Nordstrom Valve Div. 56, 57
Roots-Connersville Blower Div. Dresser Industries, Inc. 43
Royal McBee Corp. —

Safety Gas Main Stopper Co. 98
Security Valve Corp. —
Sheahan Pipe Line Construction Co. —
Skinner Co., M. B. 31
Smith Corp., A. O. —
Smith Manufacturing Co., A. P. —
Southern Cross Foresters 88
Southern Pipe Coating Co. —
Southern Pipe Div., U. S. Industries —
Southwestern Pipe Inc. —
Sprague Meter Co. Fourth Cover
Standard Electric Time Co. 10
Standard Pipeprotection, Inc. —
Studebaker-Packard Corp. —
Sun Shipbuilding & Dry Dock Co. 136
Superior Meter Co. —

Tapecoat Co. —
Tennessee Gas Transmission Co. —
Textron Inc., Apco Div. —
Tinker & Rasor 77
Transcontinental Gas Pipe Line Corp. 147
Tube Turns Div., Chemetron Corp. 124, 125

Union Carbide Chemicals Co., Union Carbide Corp. —
Union Malleable Mfg. Co. 40
Union Switch & Signal Div. Westinghouse Air Brake Co. —
United Engineers & Constructors 32
United Gas Corp. 104, 139
U. S. Industries
Garrett Oil Tools Inc. 137
Southern Pipe Div. —
U. S. Pipe & Foundry Co. 28
U. S. Steel Corp., National Tube Div. 50
Universal Controls Corp. —

Vermeer Manufacturing Co. 100
Vulcan Rubber Products, Inc. 48

Wallace Co., William —
Warren Petroleum Corp. 102
Westinghouse Air Brake Co., Union Switch & Signal Div. —
Wheatley Pump & Valve Mfg. Co., Frank 149
Wilcolator Co. 36
Williams Pressure Service Co. —
Williamson, Inc., T. D. 143
W-K-M Div., ACF Industries Inc. 130, 131

YOU, TOO, CAN GET . . .

DEHYDRATION AT A PROFIT WITH

BS&B DRY FRAC*

2, 3 or 4-TOWER

BS&B DRY FRAC
. . . is PROFITABLE
. . . is DEPENDABLE
. . . is COMPACT
. . . is COMPLETELY AUTOMATIC
. . . is SAFE
. . . is VERSATILE
. . . is FAMILIAR
. . . has UNIQUE COOLING
. . . can be WATERLESS

Short-Cycle Units For Hydrocarbon Recovery From Gas Streams At Moderate Pressures

*DRY FRAC is a trade name of Black, Sivalls & Bryson, Inc.

OVER 60 YEARS BS&B ANOTHER EXAMPLE OF PRODUCT LEADERSHIP

Want More Information? Ask Your BS&B Man, or Write to . . .

BLACK, SIVALLS & BRYSON, INC.
DEPT. I-BQ8 P.O. BOX 1714, OKLAHOMA CITY

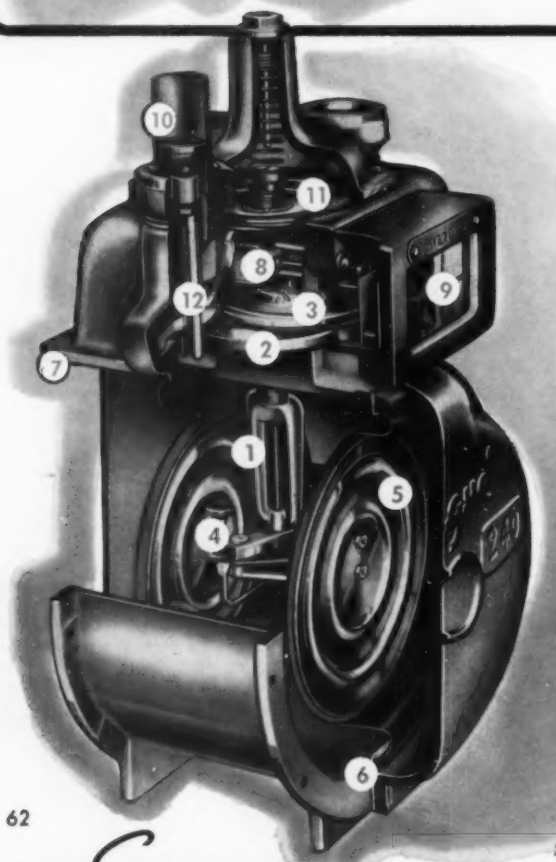
Can You Name These Parts?

(CHECK ANSWERS BELOW)

USE Only GENUINE *Sprague* PARTS

KEEP THE ACCURACY YOU BOUGHT

It doesn't pay to be "penny-wise and pound-foolish" when buying replacement parts for your Sprague meters! Genuine Sprague parts are specifically designed, precisely manufactured, and carefully inspected to insure constant accuracy of measurement, long wear, and minimum maintenance. Sprague parts are constantly being improved, too. New designs and new materials result in an even finer performance. So modernize as you maintain . . . Buy only genuine Sprague parts!



GEM

Sponsor of "PLAYHOUSE 90" on CBS-TV

ANSWERS: 1—Main Movement. 2—Valve Seat. 3—Valve Cover. 4—Diaphragm Carrier Wire Assembly. 5—Diaphragm. 6—Diaphragm Gasket. 7—Top Gasket. 8—Index Driving Movement. 9—Index. 10—Male Inlet Swivel. 11—Fulcrum Assembly, IRV. 12—Plunger Assembly.

62

Sprague Hard-Case Quality Means Long-Range Economy.

THE *Sprague* METER COMPANY • BRIDGEPORT 1, CONN.

WESTERN BRANCH — LOS ANGELES 23, CALIF. REGIONAL OFFICES — DAVENPORT, IOWA • HOUSTON 3, TEXAS • SAN FRANCISCO 11, CALIF.